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A Review of Published Literature on PPS Impacts

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A Review of Published Literature on PPS Impacts

The enactment and implementation of the Prospective Payment System (PPS) constituted a major and fundamental shift in Medicare's payment arrangement with hospitals. The PPS was designed to alter the economic incentives of hospitals--hospital administrators and attending physicians. It was anticipated that hospitals would respond to the new payment incentives in certain predictable ways such as reducing length of stay or attracting economic DRGs. The basic assumption is that hospitals are rational economic entities, responsive to the evolving payment and market incentives.

The Medicare Prospective Payment System is a "grand experiment." The grand experiment is grand insofar as Medicare hospital payments under Part A account for some 40 percent of hospital inpatient revenues, cover over 30 million people, and represent nearly 70 percent of the Medicare budget. The experimental nature of the PPS is evident insofar as a wholesale exchange in payment incentives was implemented on a wholesale basis, excluding only four waiver states, without much prior demonstration or empirical understanding of how hospitals would respond and how hospitals would fare under PPS.

Anticipating changes, possibly major changes, in the way hospitals operate, deliver services and adapt to new environmental forces, led to an almost unprecedented commitment of research and PPS impact assessment ventures. The commitment was to monitor, measure and assess the effects of PPS. A 1986 inventory of ongoing PPS research identified over 300 major studies, representing a $78 million commitment of public and private funds (Gaumer et al., 1987). This paper reviews over 40 published/public domain studies, representing the initial wave of PPS impact assessments. These studies focus primarily on the first year or two of PPS implementation.

Any review of the first wave of PPS impact studies should acknowledge some degree of cautious acceptance of findings. The PPS studies seek to detect changes in hospital performance or hospital behavior subsequent to implementation of PPS. Some observed behaviors or performance measures may be directly attributable to PPS while others reflect a continuation of prior trends (perhaps accelerated by responses to PPS incentives) or represent changes responsive to various non-PPS market forces.

The mid-1980s constitute years of significant, unprecedented changes in the organization, financing and competitiveness of health care markets, including the hospital sector. Non-PPS market forces, while difficult to take into account, may generate complementary or parallel incentives, reinforcing the PPS incentives. Some

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important changes in hospital behavior are the result of hospital responses to various complementary forces, with PPS playing a significant role. In assessing the impact of PPS, it may be useful to discern patterns consistent with PPS incentives and PPS strategy without necessarily being overly concerned about the degree to which PPS implementation has been the prime force.

The review organizes PPS impact studies and findings into the following categories:

- Utilization Effects
- Case Mix/Resource Allocation Effects
- Financial Performance Effects
- Quality of Care
- Industry and Market Related Effects

Utilization Effects

Length of Stay

Reduced length of stay was one of the principal anticipated effects of the PPS. Several studies provide strong evidence that this has in fact occurred.

In the FY86 Draft Report to Congress, HCFA reports a continuing, albeit slowing rate of decline in average Medicare lengths of stay. The same effect has been evident in the New Jersey DRG system which has been in existence for a longer period and includes all payors. For example, Hsiao and Dunn (1987), applying a time series regression model to New Jersey hospital data spanning the years 1971-84, show that the implementation of DRGs in 1981 was associated with a significant change in trend for hospital length of stay. Under the DRG program, the already declining trend accelerated downward sharply.

In addition to trend analysis, other approaches have been used to test for the effects of the PPS on Medicare length of stay. Feder, Hadley and Zuckerman (1987) compared hospitals subject to the PPS in 1984 to those still paid under the TEFRA provisions during roughly the same period of time. PPS hospitals were divided into three groups, each reflecting a different expected financial impact of the PPS. The measure used to differentiate PPS hospitals was based on each hospital's expected difference between payments under the PPS and costs under TEFRA, weighted by its relative

volume of Medicare business. It was anticipated that hospitals hurt more by the PPS would respond more strongly to its incentives. Results show that during the 1984 period, PPS hospitals reduced their Medicare lengths of stay by more than those still under TEFRA. Also, the reductions in length of stay seem to have been somewhat greater among PPS hospitals that were expected to experience a financial loss or a smaller gain.

In another analysis, Pope (1987) showed that the entire distribution of lengths of stay shifted down at about the same rate, between the TEFRA and PPS1 periods. He also presented analyses that suggested this shift principally reflected changes among regions, for similar types of hospitals, rather than compression of variance within regions.

Similarly, the Gianfrancesco and Hassol study (1987) confirms the anticipated effects of the PPS on Medicare inpatient utilization. One approach compared PPS hospitals to those in the waivered states. A cross-sectional regression model was applied to percentage changes in Medicare length of stay that occurred among waivered and nonwaivered hospitals between 1983 and 1984. A dummy variable was used to indicate whether a hospital was in a waivered or nonwaivered state, and a number of other hospital and environmental variables were specified to hold their effects constant. Results show that hospitals subject to the PPS experienced significantly greater reductions in Medicare length of stay. A second approach applied a similar regression model only to PPS hospitals. Two variables were used to measure the degree to which the PPS influenced each hospital:

- each hospital's ratio of Medicare discharges to total discharges (i.e. an index of Medicare dependence); and
- each hospital's projected PPS margin weighted by its Medicare dependence (i.e. an index of the PPS' direct financial impact).

It was anticipated that PPS incentives (e.g. to reduce Medicare length of stay) would be positively related to Medicare dependence and negatively related to the PPS' direct financial impact. Incentives would be weaker among hospitals experiencing large financial gains under the PPS. For most of the geographic groups analyzed, reductions in Medicare length of stay during the 1983-84 period were significantly larger among Medicare dependent hospitals. While the direct financial impact of the PPS was insignificant in all but one instance, in that instance it had the anticipated positive effect on Medicare length of stay.

Taking into account severity of illness upon admission, Noether (1988a) examines trends in length of stay for three tracer disease categories. Severity is measured using the Medisgrps methodology. The three tracer diseases are pneumonia,

stroke, and hip replacements. Noether found that by adjusting for changes in patient severity, the measured decline in length of stay between 1982 and 1985 was 25 percent higher than the decline measured for pneumonia and stroke cases without accounting for severity, suggesting that severity for these conditions has increased. Holding severity constant for hip replacement cases has no effect. Holding severity constant, measured reductions in length of stay between 1982 and 1985 equal 6.2 percent for pneumonia, 14.4 percent for stroke cases and 7.4 percent for hip replacement.

Morrissey, Sloan and Valvona (1988) found that mean length of stay before transfer to subacute care was much higher in waiver states than in PPS states. For example, using ordinary least squares regression analysis, stroke patients transferred to SNF care in waiver states stayed almost 6 days longer in waiver states. In addition, pre-transfer LOS in waiver states increased during the initial PPS period. In contrast, the PPS effect was a reduction in pre-transfer LOS for almost all DRGs studied. The largest declines in LOS were found in patients who were transferred to ICFs. Since there was no measurable or consistent pattern between severity of illness and length of stay, Morrissey, Sloan and Valvona suggest that patients are not being discharged "sicker." The authors anticipate that transfer rates and LOS will stabilize under PPS, providing that no new payment schemes or technology shocks occur.

The most recent report of the Prospective Payment Commission (April 1988) provides more up-to-date evidence of changes in Medicare length of stay. The statistics presented by the Commission cover the first three years of the PPS, through 1986. These data show that after a sharp initial decline during the first PPS year, Medicare length of stay stabilized. Similarly, the American Hospital Association data show length of stay reductions among the over-65 population until 1986. These multi-year findings suggest that anticipated LOS reductions occurred within the first years of PPS implementation, with further reductions uncertain.

Admissions

It was anticipated that the PPS might raise total Medicare admissions by encouraging hospitals to increase the admission of less seric is cases within each DRG. Results from the key LOS studies, which also analyzed the effect on hospital admission rates, do not show that this was the case. Empirical evidence indicates that admissions declined in the post-PPS era.

HCFA's FY86 draft report to Congress indicates that Medicare admissions continue to decline in the post-PPS era. While the rate of decline in FY86 admissions

was slightly lower than the FY85 decline, the reductions (5.3 and 4.3 percent respectively) continue to indicate a shift away from hospitalization. The report of the Prospective Payment Commission (April 1988) also includes up-to-date statistics on Medicare admissions. The decline in Medicare admissions that occurred for the first time in 1984 (the first year of PPS) accelerated in 1985 and then decelerated (though still negative) in 1986. As with Medicare length of stay, the smaller effect in the later PPS years may indicate a bottoming-out trend.

In general, there appears to be an overall reduction in admissions trends. The declines in admissions for the non-Medicare population have been even larger, suggesting that pressures on providers have come from a broad range of market and clinical forces, only one of which is Medicare payment reform.

In addition to an apparent systemwide trend, reductions in Medicare admissions or admission rates may well be attributable to the tighter peer review that accompanied the implementation of the PPS, rather than the PPS per se. This is one interpretation of Gianfrancesco's and Hassol's (1987) finding that Medicare admission ra es were in no instance affected by PPS' direct financial impact. A significant relationship was observed only between Medicare dependence and admission rates. This relationship would also capture the concurrent effect of tighter peer review. This interpretation is corroborated by the Hsiao and Dunn (1987) study: the implementation of the New Jersey DRG system, unaccompanied by increased stringency in peer review, did not significantly affect the trend in hospital admissions, which continued to grow at an undiminished rate.

Physician Services

Since the first year of PPS, Medicare Part B expenditures have increased annually, with growth rates exceeding Part A rates by a considerable margin. Between 1984 and 1986 Part B expenditures increased annually by 11.6 percent despite a physician fee freeze. While this is a slower growth rate than the 20.4 percent annual growth rate experienced between 1975 and 1983, it remains high relative to the inpatient PPS trend. For example, between July 1, 1986 and June 30, 1987, Part B expenditures grew by 20 percent while Part A rose by only 5 percent. This caused an unprecedented 38 percent increase in the Part B premium on January 1, 1988. These figures suggest that there in fact has been a considerable shift from inpatient to outpatient expenditures since the onset of PPS.

Not surprisingly, the decline in Medicare inpatient usage is leading to a shift in Medicare physician payments. The Fisher study (1987) shows that while the inpatient

hospital setting accounted for 60.8 percent of Medicare payments to physicians in 1982 and 60 percent in 1983, by 1985 the inpatient setting accounted for slightly under 50 percent of Medicare payments to physicians. Concurrently, non-inpatient Medicare payments to physicians increased from about 7 billion dollars in 1983 to 10.4 billion in 1985 while Medicare payments for physician inpatient services remained roughly the same.

Outpatient Hospital Services

Deceleration in the growth of hospital outpatient services, which began prior to the PPS, seems to have continued unaffected through the first PPS year. Feder, Hadley and Zuckerman (1987) found no significant differences between TEFRA and PPS hospitals with respect to 1982-84 percentage changes in both Medicare hospital outpatient costs and visits. The study by Gianfrancesco and Hassol (1987) also failed to detect any PPS effects on hospital outpatient services.

Post-Hospital Use

HCFA's FY86 Annual Report noted increases in SNF and home care use among Medicare enrollees over the first half of this decade. Studies using the Abt Associates "Post Hospital Trend" and Rand's "Pre/Post Post Hospital" data bases indicate that PPS affected Medicare beneficiaries' use of post-hospital care. (cites here)

The Neu and Harrison study (1988) confirms observations that Medicare patients are being discharged from acute-care hospitals more quickly, with average length of stay decreasing from 9.8 to 7.8 days and post-hospital services becoming more routine complements to earlier discharges. Concurrently, the fraction of patients using SNF care has increased to 3.1 percent (1981) from 2.5 percent. However, average covered days per SNF user declined from 29.6 days in 1981 to 25.1 days in 1984/85. Discharged patients using home health care increased from 8.5 to 13.3 percent, and average visits per user increased from 12.8 to 14.1 visits. The authors suggest that post-hospital care, and particularly SNF care, is becoming a more routine part of acute care, less chronic in nature: "There is evidence that 'marginal' patients--patients who would not have used post-hospital care--are doing so now, perhaps allowing their discharge from acute-care hospitals a few days earlier." The authors' state-to-state analysis found no indication that SNF and home health care are either substitutes or complements. States with high use of one type of care did not have either unusually high or low use of the other. Nor did states that experienced large changes in the use of one type of care have large or

small changes in the use of the other.

Courtney (1987) reports a PPS effect evident in an increase in post-hospital use (within 7 days of discharge) of SNF and HHA services. At the same time, the average number of post-hospital covered days has declined, drawn down by an increase in the percent of discharges with up to two weeks of covered days.

Lewis et al. (1987) report that the proportion of skilled nursing (SNF) patients that are Medicare beneficiaries increased sharply from 36 percent in 1982-83 to 57 percent in 1984. This, by itself, would suggest a large increase in Medicare outlays for skilled nursing care during the first PPS year. A change in SNF length of stay between the two periods does not reconcile the conflicting evidence; Lewis et al. report that this remained fairly constant. It is possible that the patient data from which Lewis et al. derive their statistics are not representative. These data were drawn exclusively from 45 SNFs located in southern California. However, the Lewis et al. findings are corroborated by evidence provided in a study by Long et al. (1987). This study, which is based on data from the Commission on Hospital and Professional Activities, shows that the proportion of Medicare patients discharged to SNFs increased significantly (by about 10 percent) in 1984 after being fairly constant in the years immediately preceding.

For home health services the Long et al. study (1987) reports a sharp increase during the first PPS year in the proportion of Medicare discharged patients receiving home health care. The PPS rate was 50 percent higher after growing at a much more modest rate during the years immediately preceding implementation of DRG payments.

Morrisey, Sloan, and Valvona (1988) analyzed the early effects of PPS on the likelihood of hospital's discharging Medicare beneficiaries to skilled nursing facilities, ICFs, and home health agencies using multinomial logit regression analysis. Their analysis concentrated on five DRGs: DRG 14 (stroke), DRG 88 (chronic pulmonary disease), DRGs 89-91 (simple pneumonia), DRG 127 (heart failure and shock), and DRGs 209-212 (major joint and hip procedures). Their results indicate that PPS had a dramatic effect on the likelihood of transfer in all DRGs and all destinations even after controlling for severity of illness. The increase in the probability of discharge to SNFs tended to be the largest; the smallest increase tended to be for ICFs. The largest increases occurred among SNF transfers for patients with major joint and hip procedures, pneumonia, and strokes.

Quality of Care

There have been and continue to be concerns that the PPS incentives to economize could jeopardize quality of care. Theoretical studies such as Ellis and McGuire (1986) argue that physician decisions reflect the interests of both the patient and the hospital. Under cost-based reimbursement physicians' utilization of hospital resources does not affect the financial status of the hospital as heavily, and more emphasis may be given to the quality of care provided to patients. The PPS greatly increased the effect of physician decisions on hospital financial status. As a consequence, some quality of care may have been forfeited and access for high cost admissions may have become more limited. In another theoretical study of the effects of the PPS on the quality of care, Allen and Gertler (1987) infer that the extent to which the PPS may reduce the quality of care is inversely related to the level of the DRG price and that because this price is relatively fixed, the more serious and costlier cases within each DRG will be more adversely affected.

Quality of care is difficult to measure, particularly in the early stages of payment reform. Several empirical studies have attempted to measure the effects of the PPS on "quality of care." Some have focused on mortality rates for Medicare enrollees; others have focused on input measures relating to the process of care. Pre- and post-PPS comparisons based on these measures can be misleading in the absence of detailed patient data. For example, changes in length of stay and other measures of hospital input could reflect improvements in efficiency rather than diminutions in quality, especially in a system of care that many regard as promoting unnecessary or inappropriate use of hospital resources. On the other hand, observed differences could reflect efficient changes in case mix, emphasizing more severe or serious cases in the post-PPS era.

Mortality Rates

The Krakauer study (1986) indicates that the observed increase in mortality among hospitalized Medicare enrollees is due to a higher proportion of more serious, high risk cases being admitted to the hospital under the PPS. DesHarnais et al. (1987), using data from the Professional Activity Study of the CPHA, found that the percentage of patients discharged dead increased between 1983 and 1984. This increase, however, is not significant since the actual value for 1984 was consistent with trend increases, commencing prior to the PPS era. Long et al. (1987), using the same data but a somewhat different approach, found the percentage of patients discharged dead to have

remained unchanged between 1983 and 1984. This study offers more reliable evidence of no negative impact on quality since it took into account case mix.

Noether (1988a), holding constant patient severity, found no increase in death rates for three diagnoses. Her study examined changes between 1982 and 1985 on mortality rates during and immediately following a hospital stay for a sample of pneumonia, stroke, and hip replacement cases. Admission severity, using Medisgrps, is positively associated with death rates in the hospital for pneumonia and stroke cases, and discharge severity is positively associated with death rates during the 90 days following discharge for all three tracers.

Overall, preliminary findings suggest that PPS has not (yet) had a negative effect on quality as measured by mortality rates, particularly when case mix and severity of illness are taken into account. Mortality rates are certainly gross measures of quality but basic nonetheless in the assessment of quality.

Severity at Discharge and Readmission Rates

Carroll and Erwin (1987) focused on Medicare patients discharged from the hospital into long term care facilities before and after PPS. They found no significant differences in admitting diagnoses, number of patients dying or returning to the hospital within 30 days, prognosis or rehabilitative potential as indicated by the physician chart. The number of patients dying or being readmitted to the hospital actually was somewhat lower in the post-PPS period. The groups were comparable in terms of proportion ambulatory, receiving medications and requiring Foley catheters. Patients differed significantly along three dimensions: incontinence, need for dietary supplements and need for a nasogastric tube. In all cases, the proportion of patients with these needs increased post PPS. These results suggest that the average severity of patients discharged to long term care facilities may have increased somewhat, but not dramatically.

Noether (1988a) examined average patient severity at discharge using the Medisgrps severity classification system. The trends between 1982 and 1985 in average discharge severity for pneumonia, stroke and hip replacement patients are positive. However, when holding constant increases in admission severity and changes in length of stay, the increase in discharge severity is significant only for stroke cases. Noether, holding constant discharge severity, found a significant increase in the rate of rehospitalization of hip replacement patients but no change for stroke or pneumonia patients. Here again, the literature provides mixed findings regarding readmission.

In another study, Noether (1988b) examined readmission rates more thoroughly using a continuous time-series of data (1981 through 1986), four tracer categories (pneumonia, stroke, hip replacement and hernia repair), and a sample of random discharges. Using multiple regression techniques to control for many patient, hospital and market characteristics, Noether found significant post-PPS increases in readmission rates for all patient categories except hernia repair. Noether also found that readmissions due to diagnoses that suggest complications following hip replacements and hernia repairs increased significantly. This analysis did not control for possible changes and related effects of patient severity.

Neu and Harrison (1988) also found that readmission rates among SNF patients have declined. However, this decline holds for 13 out of the 23 DRGs used in their analysis. The increases in readmission rates range from a low of 1.1 percent to a high of 9.4 percent.

Post-PPS readmission rates and discharge status measures are of interest because they may signal a quality of care problem. Higher readmission rates certainly warrant concern and further analysis. However, changes or shifts in discharge status may reflect an efficient shift from the inpatient hospital setting to other settings (e.g. SNF, ICF and HHA).

Case Mix/Resource Allocation Effects

Feder, Hadley and Zuckerman (1987) found the PPS to have had a significant negative impact on hospital occupancy rates, staffing and total hospital expenses. This finding is consistent with the reduced Medicare admissions and length of stay induced by the PPS. Feder, Hadley and Zuckerman found the opposite effect on staffing and a negative effect on total hospital expenses.

Intensity of Care

A PPS effect on the intensity of care was anticipated. DesHarnais et al. (1987), comparing actual to predicted values for 1984, found significant changes for a number of hospital input measures. Specifically, significant reductions were detected in total, as well as pre- and post-operative, length of stay and percentage of patients using ICUs and CCUs.

Long et al. (1987) disaggregated Medicare patients according to discharge status (self care, SNF, ICF, HHA). For each group, comparisons focused on the 1980-1984

annual changes in hospital resource allocation measures, including total length of stay, pre- and post-operative length of stay, number of lab tests, x-rays and drugs. Significant reductions for 1984 were observed with respect to all of the above input measures except drugs.

Weinberger et al. (1988) compared pre- and post-PPS hospital input measures relating to the care of Medicare patients with a primary diagnosis of diabetes mellitus. A sample of patients admitted to the hospital during 1981 served as the pre-PPS group, while a sample of admissions between July 1, 1983 and June 30, 1984 served as the post-PPS group. The frequencies of 16 different tests that might be administered to patients with the above condition were compared. In 9 of these, significantly fewer tests were performed in the post-PPS period. Also, there was less patient education by nurses or dieticians and fewer consultations. During the year following discharge, there were more medical clinic and emergency room visits among the post-PPS group. A major limitation of this study is that it fails to take into account pre-PPS trends that could explain the observed differences. It is also not clear that all of the post PPS-sample really was admitted after the hospitals in question came under PPS.

Sloan, Morrisey and Valvona (1988) assessed changes in the use of intensive care units and nonsurgical procedures before and after the implementation of PPS. They found no evidence to support the view that PPS has reduced the utilization of ICUs. The proportion of Medicare patients entering an ICU/CCU increased after 1983. The proportion of total days in ICU/CCU increased, while the average ICU length of stay decreased only .4 days between 1983 and 1985. However, the percent of inpatients receiving nonsurgical procedures was lower post-PPS and the number of routine tests per inpatient (e.g., serology and blood chemistry) decreased significantly.

The post-PPS mix and intensity of services appears to have shifted or declined somewhat. Whether these changes had an appreciable effect on quality is unclear. It is especially difficult to assess quality effects in the absence of quality of care standards other than input measures.

Financial Performance Effects

Since the PPS is a radical departure from cost-based reimbursement, it was anticipated that it could have varying financial effects on hospitals. Some hospitals might be better able to adapt and economize. The goal was to change the rules of the game and motivate more efficient allocation of hospital resources. Initial implementation of PPS was imperfect, especially with regard to data inadequacies. Some financial

performance effects were the result of hospital behavior (ability or inability to economize). Other early effects were the result of PPS payment formula or data imperfections. Over the past several years, PPS changes have been made to redress unintended and unanticipated inequities created by the new payment formula.

PPS Margins, Compensatory Imbalances and Redistributions

The Prospective Payment Commission report (April 1987) includes first-year PPS margins for different classes of hospitals. The margin as calculated by ProPAC is: PPS revenue minus Medicare operating cost, divided by PPS revenue. The average margins were substantially above zero for all classes of hospitals. Urban hospitals experienced higher margins than their rural counterparts. Among the urbans, larger hospitals experienced higher margins than smaller ones. Teaching hospitals also experienced relatively high margins, probably due to the "doubled" adjustment for indirect medical education costs that served as a proxy for case mix and severity, generally higher among teaching hospitals.

HCFA reported (FY86 Annual Report) that Medicare net income, which averaged over $500 per case in the first year of PPS, increased to $550 in the second year, with gains in large urban and teaching hospitals leading the industry.

Hendricks (1987) reported that total and operating margins increased in the first year of PPS. In addition, she reported little change in the relative performance of hospitals between TEFRA and PPS. Those that were doing poorly before PPS did poorly after implementation, and those that did well did so in both periods. Profitability effects varied widely across hospital types (urban/rural, large/small, teaching/nonteaching, proprietary/voluntary).

Friedman and Shortell (1988) found that investor-owned hospitals experienced higher operating margins than not-for-profit hospitals. All operating margins increased between 1983 and 1985. They also found that the proportion of elderly in the local population was significantly associated with margins in 1985.

The Gianfrancesco and Hassol study (1987) used regression analysis to explain differences in "projected" first-year margins among hospitals. The "projected" PPS margin differs from the actual in that it is calculated assuming that hospitals have the same operating costs and Medicare volumes as for the TEFRA year. This approach holds constant behavioral responses to the PPS that can affect hospital financial performance. The regression results revealed:

- Hospitals in higher wage areas experienced higher PPS margins;
- Sole community hospitals and rural hospitals with low occupancy rates had lower margins;
- Teaching hospitals, rural referral centers and hospitals with relatively large capital passthroughs all had higher margins;
- Hospitals with higher proportions of outliers and larger hospitals had lower margins.

Feder, Hadley and Zuckerman (1987), comparing PPS hospitals to those still on TEFRA, found an improvement in hospital operating margins under PPS. Gianfrancesco and Hassol (1987), comparing PPS hospitals to those in waivered states, found the same relationship. The improvement in overall operating margins for hospitals subject to the PPS is consistent with the "unintended generous payments" of the first year.

An explanation for the higher PPS margins among teaching hospitals may be found in a study by Welch (1987). Hospitals designated as teaching institutions under the PPS receive an adjustment to their DRG rates to cover the costs associated with the teaching function and the treatment of more severe cases within each DRG. However, only 115 of the 1,000 or so hospitals receiving this adjustment are Council of Teaching Hospitals university hospitals. Analysis by Welch indicates that only COTH hospitals can be shown to treat more serious cases within each DRG, implying that the adjustment is unjustified for the majority of hospitals designated as "teaching." The author also argues that residents in teaching hospitals substitute for hospital-based physicians, in part offsetting the costs relating to the teaching function and further increasing the "profitability" of teaching hospitals.

While some of the distributional effects of the PPS may have been anticipated or intended, most appear to be the result of oversights or unforeseen imperfections in the payment methodology. As long as the PPS margins generally remain well into the positive range, these distributional imbalances may be tolerated. However, recent statistics contained in the latest report of the Prospective Payment Commission (April 1988) indicate that these margins have been shrinking since the first year of PPS. For example, the average margin for all hospitals was less than half in the third PPS year (1986) of what it was in the first year, and the average margin for rural hospitals has fallen to nearly zero.

Additional redistributions, intended and unintended, will result from the transition to national rates. Simple projections by Potetz and Buchberger (1985) indicate that rural and larger urban hospitals will lose ground. In a later study, Sheingold (1986)

attempted to estimate the "unintended" portion of the payment redistributions that are likely to occur under national rates. Depending on the set of assumptions, the unintended redistribution could be well in excess of two billion dollars. The biggest losers from this redistribution are projected to be major teaching hospitals, large hospitals (both urban and rural), central city hospitals in large metropolitan areas and rural hospitals adjacent to urban areas. When the financial solvency of hospitals is in jeopardy, these distributional effects will not be long tolerated.

Structural Imperfections Relating to DRG

Some studies have investigated imperfections relating to determination of DRGs or DRG relative prices. These imperfections can also cause undesirable redistributions.

DesHarnais et al. (1988) provide evidence indicating that the elimination of age as a basis for DRG classification would significantly reduce the within-DRG variation in length of stay and costs. In the current DRG system used for Medicare patients, there are 95 DRG pairs where one of each pair pertains to patients that are under 70 years of age and without complications or comorbidities and the other, to those who are 70+ or with commorbidities and complications. Findings indicate that for all 95 pairs, age alone does not account for significant differences in length of stay or costs. Thus, compensation for individuals who are 70+ but without complications or comorbidities is excessive. Therefore, reclassification to exclude age would improve the efficiency and equity of the DRG system.

Another study by Lave (1985) provides evidence to support the view that DRG prices are compressed--prices of truly high cost DRGs are set low relative to their actual costs whereas the prices of truly low cost DRGs are set high relative to their actual costs. Lave argues that this compression is mostly due to initial miscoding by hospitals and to the DRG pricing algorithm which fails to adequately account for the differing resource intensities between high and low cost DRGs. HCFA's relative prices were compared to those used in New Jersey and Maryland. Both states are waivered from the PPS but use somewhat different systems to reimburse for Medicare. Results show that the New Jersey and Maryland relative prices are more broadly distributed. The compression in PPS-DRG relative prices causes inequity in that hospitals treating a larger proportion of higher cost DRGs will be undercompensated. This is corroborated by the finding by Gianfrancesco and Hassol (1987) of a negative relationship between the casemix index and PPS margins for a specific group of hospitals.

Thorpe (1988) examined factors accounting for higher costs in urban hospitals as well as their relative contribution to those costs. He found that 50 percent of the cost difference between the highest and average-cost urban hospitals was linked to graduate medical education. Casemix differences accounted for 20 percent of the cost difference, and over 7 percent of the costs were traced to admission of patients through the emergency room as well as admissions of a large volume of poor patients. Higher costs have been accounted for by Medicare in teaching hospitals, and recently Medicare increased its payments to hospitals serving a disproportionate share of low-income patients.

Inpatient Expenditures

A principal reason for implementing the PPS was to reduce the growth in Medicare inpatient expenditure. The reductions in admissions and length of stay would seem to have had this effect. Changes in case mix, due to "DRG creep," may have offset this effect somewhat. However, the decline in the rate of growth in Medicare inpatient expenditure had already begun a few years prior to the implementation of the PPS. This, in conjunction with the fact that other influences were not held constant, make it difficult to attribute the 1983-84 decline solely to PPS.

Feder, Hadley and Zuckerman (1987) analyzed percentage changes in both Medicare inpatient revenues and costs per case during the 1982-1984 period. Their comparison of PPS and TEFRA hospitals showed no significant difference with respect to revenues per case. This finding is consistent with the now acknowledged fact that the DRG formula and data problems resulted in initial overpayments. Percentage changes in Medicare inpatient costs per case, however, were significantly lower for PPS hospitals. They were even lower among those PPS hospitals that stood to lose or to gain less under the new system.

Analysis of the effects of the New Jersey DRG system by Hsiao and Dunn (1987) also show a significant negative impact on costs per case or admission. Another study by Rosko and Broyles (1987), also dealing with the effects of New Jersey's DRG but taking a somewhat different analytic approach, shows the same negative impact on costs per case. However, the Hsiao and Dunn study also analyzed inpatient costs per capita (statewide population) and did not find any significant changes at this state population level. This may be explained by the fact that an increase in the hospital admission rate (though not significantly different from trend) accompanied the implementation of the New Jersey DRG system.

The report of the Prospective Payment Commission (April 1988) indicates that cost per case increased at a faster rate after the first PPS year. The percentage changes for 1984-1985 and 1985-1986 were 10.0 and 10.4, respectively, as compared to 7.6 for 1982-84. This acceleration is consistent with the evidence that Medicare length of stay remained virtually unchanged during these latter years after dropping sharply in the first PPS year.

Industry and Market Related Effects

Cost Shifting to Other Payers

Concerns have been expressed that the PPS would induce hospitals to shift Medicare costs to other payers who continue to reimburse on the basis of costs or charges. A theoretical analysis of this potential effect of the PPS is presented by Foster (1985). The principal implication of Foster's analysis is that cost shifting under the PPS is not very likely. Hospitals are assumed to behave in a manner consistent with profit maximization, and underpayment by Medicare is inferred to be a necessary condition for cost shifting to other payers. Foster concludes that the PPS will not result in cost shifting if hospital unit costs are constant. Charges to other payers will remain at the profit maximizing level and the only effect will be to reduce Medicare volumes so as to minimize the losses from underpayment. If hospital unit costs are decreasing, cost shifting may result only if losses from underpayment can be minimized by reducing Medicare volumes. This would cause the profit maximizing charge to other payers to increase. Alternatively, if the losses from underpayment are minimized by expanding Medicare volumes, the profit maximizing charge to other payers would decrease.

However, evidence from one study does exist that the PPS may have induced some cost shifting, but it must be weighed against contradictory findings of another study. The Gianfrancesco and Hassol study (1987) found that allowances and discounts to other payers may have been reduced in some instances. Also, this study revealed strong evidence that the PPS positively influenced average length of stay for non-Medicare patients, another form of cost shifting. Nonetheless, Feder, Hadley and Zuckerman (1987), using a different approach, obtained the opposite result. The number of market forces affecting the hospital's ability to cost-shift must include more aggressive private sector cost-containment pressures.

Uncompensated Care

Sheingold and Buchberger (1986) estimated the effects of the PPS on the volume of uncompensated care provided by hospitals. The simulated effects were based on elasticities of uncompensated care with respect to operating margins (calculated from AHA data) and projections of the PPS' financial impact. The study concluded that the PPS would result in small increases in uncompensated care for some types of hospitals and regions of the country and in decreases for others. A later study by Gianfrancesco and Stavins (1988), based on actual post-PPS measures of uncompensated care (from the Medicare cost reports), found no evidence of any PPS effects on the volume of uncompensated care provided by hospitals.

PPS Exempt Facilities

In addition to hospitals in the waiver states, certain types of facilities are specifically excluded from the PPS. These include specialized hospitals (psychiatric, rehabilitation, substance abuse, long term and childrens) and select hospital units (psychiatric, rehabilitation and substance abuse).

Hatten and Gibson (1987) present evidence showing that during 1984-86 Medicare discharges increased considerably among the exempt hospitals and exempt units (with the exception of long term hospitals) while they decreased among the PPS hospitals. The increases for the PPS exempt units were much more pronounced. It is difficult to judge from the limited evidence whether the PPS induced a shift to the exempt facilities. Since this analysis did not examine data on pre-PPS discharges for the various types of facilities, it is not known if the patterns observed for 1984-86 were present prior to this period. Other market forces could also explain growth patterns.

Taube et al. (1988) examined changes in resource use by Medicare psychiatric patients in general hospitals after the introduction of PPS in 1984. They found that length of stay and charges per discharge during 1984 fell 13.8 percent and 15.9 percent, respectively, even though 31.8 percent of the discharges for Medicare cases were from exempt psychiatric units. The decrease in LOS was larger (23.2%) in hospitals that were not exempt from PPS.

Lave et al. (1988) analyzed the decision to seek an exemption from PPS. They found that hospitals with psychiatric units that were exempt from PPS were more likely to suffer losses under that payment scheme relative to cost-based payment than were

non-exempt units. Their results provide evidence that hospitals with psychiatric units responded to PPS financial incentives.

Investment and Technology

Gaynor (1987) has made preliminary estimates of PPS impacts on rates of investment and service adoption in the hospital industry. Since decisions relating to capital tend to lag behind decisions on variable resources such as labor, Gaynor's conclusions must be viewed with caution. This study reports a first-year increase in fixed assets per bed, due in part to a contraction in the bed supply, and a slight decrease in net fixed asset creation. It is too soon to tell whether or not hospitals have tried to "deepen" their capital stocks, by providing more capital per bed. Gaynor's finding that the rate of services diffusion does not seem to have declined suggests that hospitals adding new capital after PPS continue to seek out new technologies. Also, it is important to remember that capital was not included in the PPS but subject to cost-reimbursement under Medicare. The capital payments pass-through runs counter to the PPS incentives and thus it is anticipated that capital investment would not shrink in the early PPS years.

Competitive Effects on the Hospital Industry

PPS is reported by hospital administrators as one of many influences on the structure and processes within U.S. hospitals within the past five years. Cromwell (1987), reporting on a ten site intensive case study of the impact of PPS on hospitals and other health care providers, notes a wide range of responses, including structural alterations to plant, changes in staffing levels, patterns and wage scales, programs implemented to effect cost savings in non-labor areas (supplies, energy, etc.) and changes in organizational structures (the emergence of "umbrella" holding companies) and streamlining of management. Many of the CEOs interviewed attributed major changes to concurrent market forces, but the continuing pressures exerted through the Medicare payments system and Peer Review Organizations' review clearly played a part in validating existing initiatives toward greater efficiency.

The potential effects of the PPS on individual hospital efficiency have been acknowledged. A principal objective of prospective payment per case was to induce hospitals to provide treatment in a more cost efficient manner. It was anticipated that over the long term the PPS would encourage the elimination, where possible, of inefficient sized hospitals. Hospital closures are increasing, primarily among smaller

hospitals. Larger hospitals in many areas, however, are shrinking, as low occupancy rates force them to streamline. The Dranove study (1987) suggests that the PPS should encourage hospitals to specialize in those DRGS in which they are most efficient. The fixed DRG price will cause hospitals with unit costs in excess of that price to reduce admissions within the DRG of cost cutting is not practical. The opposite will occur for hospitals with unit costs below the DRG price.

While specialization may be efficient, it may have some undesirable consequences. For example, to the extent that specialization and the elimination of inefficient sized hospitals lead to a greater concentration of hospital facilities, access to care may be adversely affected. Dranove also notes that if hospitals are able to distinguish between cheap and expensive patients prior to admission, they may try to specialize in cheap patients.

The HCFA Report to Congress (1986) documents structural changes in the hospital industry. Hospital administrators, in addition to eliminating and converting beds to other uses, reduced staff and changed the skill-mix of staff used, utilized more joint purchasing arrangements and initiated various other cost-saving arrangements with other providers.

Zwanziger and Melnick (1988) found that California hospitals in more competitive markets have lowered their costs significantly as a result of regulatory and market incentives to compete on price. They suggest that a structural change in the nature of hospital competition has taken place in California following the implementation of the PPS program and the 1982 "pro-competition" legislation that implemented contracting procedures with hospitals serving Medi-Cal patients. While most previous research suggested that hospitals in relatively competitive markets tended to have higher costs than those in less competitive markets (consistent with the theory that hospitals compete on a basis of quality and amenity rather than price) no one had studied the effect of programs designed to increase price competition. Zwanziger and Melnick estimated that in 1983 hospital costs declined 1.3 percent, and the costs continued to decrease in 1984 and 1985, by 4.6 percent and 6.1 percent, respectively. Their findings are consistent with Feder et al., insofar as high-cost hospitals differentially lowered their costs as a result of the revenue constraints imposed by the PPS program.

SUMMARY PROFILE

The first wave of PPS studies support arguments regarding a number of anticipated responses to PPS incentives. Consistent with the demands for greater efficiency in delivery of hospital services, hospitals appear to have responded by:

- Achieving initial reductions in Medicare length of stays. The reductions in Medicare length of stay appear to have been somewhat greater among PPS hospitals that experienced a financial loss or smaller gains (lower margins). Significant reductions in length of stay occurred within the first year of implementation, with successive year reductions occurring at more modest rates and bottoming out by 1987.

- Shifting more services outside of the inpatient hospital setting, including increases in physician ambulatory care services, discharges to subacute care institutions (SNFs, ICFs) or post-hospitalization home health services. This is also seen in the reduced rates of increase in inpatient hospital expenditures for both physician services and subacute care services subsequent to hospital discharge. Substitution of lower cost services was anticipated and is a logical response to PPS. Also, these shifts can be viewed as system responses to assure or maintain quality of care for the recently discharged population.

- Reducing scope, mix and level of inpatient services. While the most significant reduction in service has been reduced length of stay, complementary reductions occurred in the use of laboratory tests, and related services such as patient education and consultation for selected diagnoses. Findings regarding the use of ICUs/CCUs are inconclusive given conflicting results of key studies. Reductions in the intensity of inpatient services is a rational response to a fixed payment system. To the extent that there was slack in the system, such reductions are reasonable and desirable. Future studies should assess extent of continuing reduction in the scope, mix and level of services as a means for identifying potential access and quality problems.

Other anticipated PPS hospital responses have been the subject of analysis but study findings differ in ways to warrant further investigation and review of the potential confounding implications of certain methodologies. Several key areas of hospital operations or performance that remain subject to unconfirmed, inconclusive or conflicting findings are: PPS impact on hospital occupancy rates, uncompensated care, hospital staff to bed ratios, hospital operating expenses per patient day, and PPS impact on hospital capital investment and technology expansion.

The nation's healthcare industry, particularly the hospital sector, has been undergoing significant changes over the past decade, with trends becoming apparent as a result of PPS studies employing a controlled pre/post design. For example, admissions

had been declining for a number of years. Despite the presumed PPS incentive to increase admissions, the prevailing trend continued. PPS may be accelerating certain trends, such as reductions in length of stay and the use of post-hospitalizations subacute care services (nursing home and home health).

Important aspects of the PPS effects investigation will require a longer time horizon to permit sufficient time for hospitals to more fully and rationally respond to the DRG payment incentives. The areas of greatest concern, particularly PPS impact on access and quality, and potentially greatest impact on hospital industry, such as hospital reorganization and capital investment, require sophisticated methodologies and multi-year data bases. Preliminary first-year or two partial responses are suggestive, and warrant revisiting.

In both the access/quality and hospital restructing/capital investment areas, a greater commitment to expanding the conceptual and empirical orientation is needed. The change to a prospective payment system and its incentives was based in part on the notion that there was considerable system slack. Reductions in services were anticipated and sought. That these have occurred need not necessarily suggest that access or quality has been jeopardized or unduly compromised. The same is true in the hospital restructuring/capital investment area. If prior year "operations and performance" were inefficient, then changes must be assessed from a somewhat different performance baseline. With no consensus on the preferred future configuration of the healthcare industry or the hospital sector, it is clearly difficult to assess the merits of observed changes.

HMO ENROLLMENT

AGGREGATE DEMAND

MEDICARE PROs AND FIs

MEDICAID IMPACTS

MEDICAID PHC USE

CROSSOVER USE AND SPENDING

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MEDICARE PROGRAM OPERATIONS

Working Paper

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HMO ENROLLMENT

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EXECUTIVE SUMMARY

This report describes the mandate, operations and record of the two agencies with administrative responsibility for the Medicare program: Peer Review Organizations (PROs) and Fiscal Intermediaries (FIs). The information presented is largely descriptive, and perceptions gathered during case study site visits are used to explain the quantitative information presented. The focal issue throughout this report is the degree to which these administrative agencies differ in their practices, and whether this variability is workable in a national Medicare program like PPS.

One of the basic objectives of Medicare's Prospective Payment System (PPS) is to pay a uniform amount for the care of identical patients, regardless of which provider actually serves the patient and regardless of where the provider is located. Decentralized administration and peer review have long been part of the Medicare program. But, the large amount of variation found in the way FIs and PROs interpret and apply national Medicare regulations may result in a more localized program than Congress intended. At issue for Medicare administration is whether this local variability meets the goals of a national, equitable program or whether efforts should be made to promote greater uniformity and consistency in the administrative practices of the PROs and FIs.

The major findings presented in this report include:

PROs

- There is wide variability across states in both the level of existing problems the SuperPRO evaluators identified in medical records, and in the success of PROs in detecting these problems. The PRO detection ratings are probably the best evaluation measure of each PRO's performance, since they quantify how much of the existing problem each PRO is able to detect.

- Another element in evaluating the variability in PRO performance, is the stringency with which PROs deny care that they find to be inappropriate or unnecessary. Again, there is a considerable degree of variability across PROs. Denial stringency indicates the percentage of reviewed cases that each PRO denied. There is no evaluative component to determine whether PROs are denying the correct services, underdenying or overdenying.

Denial stringency could be interpreted as measuring the rigor of PRO operations. An alternative explanation may be that in states where the PRO does not engage in extensive denial activity, hospitals are performing well within PRO standards for appropriate and necessary care. Only in states where hospitals provide unnecessary care would the PRO be forced to deny more services. This is the way PROs themselves apparently interpret denial rates.

- While it is not possible to directly attribute changes in medical practice to PRO review alone, based on our case studies it does not appear that hospitals, bowing to PPS financial incentives, are pressuring physicians to change their practices. Rather, physicians and hospital administrators report that the external pressure exerted by the PROs has the greatest influence in changing medical/admitting practices.

FIs

- FIs review and process claims for all Part A providers. For each type of provider there are wide variations in the percent of claims denied, across states and across regions. There are at least four possible explanations for this wide variability:
  1) differences in local provider practices require more or less vigilance on the part of the FI, 2) some FIs are more rigorous or stringent in applying review criteria than others, 3) FIs may interpret HCFA regulations differently, or 4) differences in HCFA regional offices' interactions with FIs result in more pressure being felt by FIs in some regions than in others.

- Concern was expressed by providers in many case study sites that FIs and PROs are "tough" on hospital care and deny a lot of these claims, and at the same time the FIs are "tough" on other services as well, leaving no avenue for services substitution. FIs in some states do indeed deny more of both inpatient and other non-hospital services, than do FIs in other states.

- The combination of PRO inpatient denials and FI inpatient denials also varies considerably across states. Whether the high denials rates are due to FI/PRO rigor or inappropriate provider practices, hospitals in states ranking high on both types of inpatient denials probably experience the greatest pressure to reduce services and/or conform to the guidelines of the administrative agencies. This cumulative denial "burden" is one way of identifying states where hospitals (and by extension physicians) are medical/administrative practices.

- The goal of the FI evaluation program conducted by the HCFA -- CPEP -- is the same as for any other evaluative effort: to discriminate the successful performers from those with poor performance, so that remedial action can be taken with the latter group. The range, or distribution, of CPEP scores each year is extremely narrow, with very small standard deviations.

  It may be that the CPEP instrument itself, and the way it is administered by the HCFA regional offices, is a poor evaluation tool. An alternative explanation is that the CPEP correctly indicates the similarity of FI performance nationwide; after many years of administrative interaction with the HCFA, FIs may be so homogeneous as to make their performance virtually indistinguishable, one from another.

Interstate Differences in Utilization and Denials

- We calculated utilization rates for Part A services (Hospital, SNF, HHA) per 1,000 beneficiaries by state, and again found considerable variability nationwide.

- We tested whether interstate differences in hospital inpatient denials contribute signficantly to the observed variation in utilization, and were unable to confirm that variation in denial activity accounts for any of the variation in inpatient utilization.

- A similar analysis examined HHA and SNF utilization and denial activity variation nationwide. The findings were mixed and suggest, but do not consistently support a definitive conclusion as to whether variation in denial activity influences the observed variation in utilization.

1.0 BRANCHES OF PROGRAM OPERATIONS

The Health Care Financing Administration (HCFA), working through its regional offices, is the governmental agency responsible for administering the Medicare program. The HCFA contracts with independent agencies to manage the program. Claims processing, claims payment, cost report audits, and review of appropriateness of nonhospital services are performed by Fiscal Intermediaries (FIs). Review of the appropriateness, necessity and quality of hospital care provided to Medicare beneficiaries is performed by Peer Review Organizations (PROs). The following sections describe these administrative agencies, their history, and their functions under the PPS.

1.1 Fiscal Intermediaries

The 1965 Medicare legislation mandated that the government enter into contracts with organizations to administer the Medicare program, and that these contracts result in neither profit nor loss to the contractor. Cost-reimbursed contracts were considered necessary to encourage participation in the program, and the use of existing insurance organizations promised rapid implementation and efficient administration.

Over time, the HCFA has increasingly focused on the cost and quality of contractor performance. In 1972 a number of experiments were begun wherein FIs competed for fixed price contracts; other incentive arrangements were also fielded as demonstrations. There are a few FIs currently operating under fixed price contracts, but the majority of FIs remain costreimbursed. HCFA currently contracts with over sixty organizations to serve as Part A Fiscal Intermediaries (and with over thirty organizations to serve as Part B Carriers). 1986 cash outlays to FIs for administering Part A of the Medicare Program totaled $322,207,094.

While the majority of FIs are state or local Blue Cross plans serving providers in their local areas, a few large commercial insurers operate as FIs on a national level. Part A providers (hospitals, SNFs, HHAs) may select their FI, if more than one is operating in their area. Recently, the HCFA has taken steps to limit this choice for certain types of providers: in 1986, HCFA designated ten regional FIs to service freestanding home health agencies, and two FIs were designated for hospices.

FIs are responsible for processing claims and for cost report activities, for Part A providers. They also undertake coverage compliance activities, and medical/utilization review for non-hospital Part A providers. Coverage compliance involves reviewing claims to determine whether the items and services are covered under Medicare and to verify technical program requirements such as beneficiary eligibility. The function of medical review, as distinct from coverage compliance, is an area where FIs share responsibility with PROs. PROs perform this function for hospital inpatients, and FIs for all other hospital services and for other Part A providers. The FIs and PROs in each area coordinate their medical review activities, so that PRO review decisions are incorporated into the FIs' claims adjudication systems.

Prior to PPS, FIs performed all medical review. With the shift of this function to the PROs for hospitalized patients, and the recent move to regional FIs for free-standing home health services and hospice care, FIs now have much reduced medical review responsibilities for Part A Medicare patients. With the exception of those FIs selected to be regional home health and hospice intermediaries, FIs now handle only the following reviews:

- All coverage determinations;
- Medical review for patients treated in SNFs; and
- Medical review for patients in hospital-based HHAs.

FIs are evaluated via an elaborate review and scoring program conducted by HCFA's regional offices each year, known as the Contractor Performance Evaluation Program (CPEP). The CPEP is based on the application of specific performance criteria measuring whether or not basic functional requirements have been fulfilled by each FI. CPEP also includes statistical standards measuring the cost effectiveness and processing efficiency of FI operations. The CPEP performance elements and scoring change, at times quite dramatically, from year to year.

CPEP is comprehensive in that it evaluates all aspects of a contractor's operations, and uniform in that the same review elements are applied nationwide. It is also somewhat subjective, since many items are not scored based on a quantifiable standard but rather involve a more qualitative assessment of performance. In addition, there may be some variability in the

way difference HCFA Regional Offices conduct the CPEP evaluations. The evaluation of FIs is discussed further in Section 3.0 below.

Although all FIs perform essentially the same functions nationwide, there may be differences in practices, interpretations of rules and rigor of medical review across FIs. For example, the definition of a "homebound" patient is somewhat unclear in the HCFA instruction manuals used by FIs. During case studies we found FIs that apparently classified as homebound only those patients who could not leave their homes at any time for any purpose. Other FIs were a bit more lenient, allowing periodic visits to physicians offices of to church, while still considering the patient homebound (and therefore eligible for home health services). This sort of variability across FIs has the potential of introducing local variability in the administration of the national Medicare program.

1.2 Peer Review Organizations

Utilization review of hospital care provided to Medicare beneficiaries was mandated in the original Medicare legislation of 1965. Due to inadequacies in the original systems developed for Utilization Review, Congress passed legislation in 1972 creating Professional Standards Review Organizations (PSROs). PSROs, comprised of local physicians, were responsible for assuring that services provided to Medicare beneficiaries were medically necessary, that quality of care met recognized standards, and that patients were not admitted to the hospital if their needs could safely be met in an outpatient setting. At their height, PSROs involved over 50% of practicing physicians in areas where PSROs existed.

In 1982, Congress passed the Peer Review Improvement Act, establishing Peer Review Organizations (PROs) to replace the PSROs. In 1983, the legislation enacting the Prospective Payment System (PPS) was passed, and in 1984 PRO contracts were negotiated and signed. In 1986, cash outlays from the Medicare trust fund for the PRO program totaled $151,157,000.

Rigorous review of hospital services provided to Medicare beneficiaries under PPS was considered extremely important by Congress and the HCFA. There was concern that PPS incentives could lead to undesirable practices by providers. For example, hospitals might attempt to increase admissions, since payment under PPS is on a per-admission basis. PPS

incentives might also encourage hospitals to provide the minimum necessary services (or even substandard care). These and other concerns prompted Congress and the HCFA to endow the PRO program with an enhanced mandate to review the care provided to hospitalized Medicare beneficiaries, and the authority to enforce determinations concerning inappropriate practices. The combination of the PPS and PROs, instills both financial incentives and oversight with enforcement authority, having the potential to alter medical practices and costs of care.

There are fundamental differences between PROs and their forerunners, the PSROs. The PRO for each state was selected through a competitive contracting process while PSROs were grant agencies. PROs have the authority to deny payment to providers and to sanction providers when appropriate, giving them a tool for enforcement not heretofore available (the PSROs could only recommend such actions to the Secretary of HEW). And PROs are evaluated by an outside entity, the SuperPRO (described below); the PSROs were never evaluated by the HCFA in such a systematic manner.

During the first round of competitive bidding for PRO contracts, each PRO proposed objectives to be met during the contract period; each PRO was therefore different, in some respects, from every other. This model was used by HCFA in the interests of continuing to recognize local medical practices and local problems, rather than imposing strict criteria across the nation. In the first PRO contracts there were eight categories of reviews where each PRO proposed specific objectives. In each of these eight categories, each PRO targeted specific DRGs, procedures and/or providers for intensive review. (PROs examine only inpatient care; they do not examine outpatient services provided to Medicare beneficiaries). The DRGs and procedures selected by each PRO were accompanied in the contracts by a rationale for targeting these types of cases; again, this focused on the practices and problems in each state.

In addition to these PRO-specific contract objectives, there were several types of review that all PROs perform, ensuring a degree of uniformity nationwide. In the first two years of PRO operations, the reviews required of all PROs included: preadmission review of common surgical DRGs, review of all admissions occurring within 7 days of discharge (later lengthened to 14 days), review of all permanent cardiacpacemaker implantations and reimplantations, review of transfers to exempt units and to other PPS hospitals, DRG coding

validation, review of outlier cases, admission pattern monitoring, and monitoring the denial notices that hospitals issue to Medicare beneficiaries to ensure that these notices are not misleading.

The PRO contracts are reopened for competitive contracting every two years. This creates the need to evaluate PRO performance. Through another (biannual) competitive contracting process, the HCFA selected SysteMetrics, Inc. to act as the SuperPRO, or PRO evaluator. The SuperPRO uses a set of standards and criteria, applied consistently nationwide, to evaluate the performance of PROs. The SuperPRO evaluation of PROs is discussed in Section 2.2 below.

Across PRO contracts, there were varying levels of "sophistication" in the methods used to identify problematic DRGs, varying numbers of DRGs selected, and varying levels of effort at problem correction. This had the potential of introducing a significant amount of variability in the PRO program across the country.

In the second contract period, each PRO was permitted much less flexibility in the objectives they proposed to meet; there were only three categories of objectives for the PROs to select DRGs for intensified review, with a forth to be determined after the contracts were awarded, in consultation with HCFA. The varying levels of stringency, sophistication, and success across PROs, as well as the variability in the types of DRGs targeted by the PROs, probably contributed to HCFA's decision to incorporate less local variability in PRO contracts.

1.3 Sources of Local Variability

To the extent that the administrative agencies differ as to the types of cases they focus on and deny, the criteria used in determining appropriateness of services, and the energy with which they perform their functions, providers (and beneficiaries) may have very different experiences under PPS. For example, in many states, care provided to patients with medical back problems is intensively scrutinized by the PRO. Hospitals and physicians in these states most likely became quickly cognizant of the intensive review these cases receive, and changed their admitting practices and/or diagnostic labeling accordingly. In other states, there may continue to be inappropriate or unnecessary admissions of patients with medical back problems.

Similarly, the FIs in some areas might deny SNF placement for certain types of patients, preferring less costly home health care for such patients. Physicians might hospitalize such patients for a few extra days, knowing that they will receive skilled nursing care for only an hour or two a day in their homes. Where SNF placement for such patients is sometimes permitted by the FI, physicians might be more willing to discharge their patients early, knowing that they will receive inpatient skilled care for a week or two before returning home. This latter pattern would save hospitals money, because they would not be providing more days of care for the same reimbursement (but could cost the Medicare program and beneficiaries more post discharge, because SNF placement may be more costly than home health care).

Clearly then, the administrative agents responsible for implementing PPS, have the potential to affect the nature of medical practice, and potentially the cost of the Medicare program, in local areas. While it is not possible to identify all the elements of local variability (such as each FI's implicit operating rules regarding SNF placement criteria), it is possible to examine some elements of variability in performance across PROs and FIs. If FIs are aggregated at the state level and combined with state specific PRO performance information, some of the variability in PPS administration from state to state can be described.

2.0 PRO PERFORMANCE AND EVALUATION

This section examines several types of variability in PRO performance:

- PRO Contract Objectives.
- SuperPRO Evaluation and PRO Success in Detecting Problems in Medical Records.
- PRO Stringency in Denying Services/Admissions.

2.1 PRO Contract Objectives

As discussed above, PROs each selected specific DRGs and procedures that they targeted for intensified review. The categories of contract objectives were:

Admission Objectives

1. Reduce admissions for procedures that could be performed effectively and safely in an ambulatory setting/outpatient basis;
2. Reduce the number of inappropriate or unnecessary admissions or invasive procedures, for specific DRGs;
3. Reduce the number of inappropriate or unnecessary admissions or invasive procedures by specific practitioners or in specific hospitals.

Quality of Care Objectives

4. Reduce unnecessary hospital admissions resulting from substandard care provided during the prior admission;
5. Assure the provision of medical services which, when not performed, have signficant potential for causing serious patient complications;
6. Reduce the risk of mortality associated with selected procedures and/or conditions requiring hospitalization;
7. Reduce unnecessary surgery or other invasive procedures; and
8. Reduce avoidable post operative or other medical complications.

The following Matrix, Table 1, displays the most commonly targeted DRGs appearing in the initial PRO contracts. Any DRG mentioned by at least 5 PROs, in at least one of the contract objective categories, appears in this

TABLE 1

PRO CONTRACT OBJECTIVES (First Contract Period)

Number of PROs Targeting DRGs, by Contract Objective Category*

Commonly Targeted DRGs**	Reduce Admissions for Procedures that can Safely be done out-	Reduce Admissions for for Selected Procedures and DRGs	Reduce Readmissions due to poor care in the Prior Admission	Reduce Mortality in Selected DRGs	Reduce Unnecessary Surgery	Total Across 5 objectives
6	6					6
39	11	13			4	28
68		7				7
88		14				14
89		12	3	1		16
90		6				6
96		6	2			8
97		6				6
107		5		1	1	7
116		8			1	9
123				7		7
134		9				9
161	4	5			6	15
162	2	5			4	11
182	1	21	1			23
183	1	11	1			13
188		8	1			9
197		6			5	11
198		4			5	9
209		5			7	12
225	6	1			1	8
243		22				22
244		5				5
294		11	1			12
320		6				6
336		8			7	15
337		8			6	14
467		5				5

* Other contract objective categories either show no consistency (i.e. fewer than 5 PROs target any single DRG) or ICD-9-CM codes are used to specify procedures; without diagnostic codes these procedures cannot be grouped into DRGs.

** DRG appears in at least one contract objective category, of at least 5 PROs

Source: PRO Contracts; Health Care Financing Administration, HSQB

DRGs APPEARING IN TABLE 1*

DRG	TITLE
6	Carpal Tunnel Release
39	Lens Procedures
68	Otitis Media and URI Age)69 and/or Comorbidities and Complications (CCs)
88	Chronic Obstructive Pulmonary Disease
89	Simple Pneumonia and Pleurisy age)69 and/or CC
90	Simple Pneumonia and Pleurisy age 18-69 w/o CC
96	Bronchitis and Asthma Age)69 and/or CC
97	Bronchitis and Asthma Age 18-69 w/o CC
116	Permanent Cardia Pacemaker Implant w/o AMI or CHF
123	Circulatory Disorders with AMI, Expired
134	Hypertension
161	Inguinal and Femoral Hernia Procedures Age)69 and/or CC
162	Inguinal and Femoral Hernia Procedures Age 18-69 w/o CC
182	Esophagitis, Gastroenteritis and Misc. Digestive Disorders Age)69 and/or CC
183	Esophagitis, Gastroenteritis and Misc. Digestive Disorders Age 18-69 w/o CC
188	Other Digestive System Diagnoses Age)69 and/or CC
197	Total Cholecystectomy w/o C.D.E. Age)69 and/or CC
198	Total Cholecystectomy w/o C.D.E. Age (70 w/o CC
209	Major Joint Procedures
225	Foot Procedures
243	Medical Back Problems
244	Bone Diseases and Septic Arthropathy Age)69 and/or CC
294	Diabetes Age =)36
320	Kidney and Urinary Tract Infections Age)69 and/or CC
336	Transurethral Prostatectomy Age)69 and/or CC
337	Transurethral Prostatectomy Age (70 w/o CC
467	Other Factors Influencing Health Status

* DRGs reflect groupings applicable in 1984, when first PRO contracts were specified.

matrix. (Several contract objectives targeted procedures, identified by ICD-9-CM codes, that cannot be grouped into DRGs without diagnostic information. These categories/procedures do not appear on this matrix).

The most commonly targeted DRGs are #39, #182, and #243. DRG #182 accounted for 3.5% of all Medicare admissions in 1984, and includes esophagitis, gastroenteritis and miscellaneous digestive disorders, inpatients over 69 years of age or those with comorbidities and complications. PROs were apparently concerned about both the appropriateness of these admissions and whether this is the correct DRG assignment for such patients. Similarly, DRG #243, medical back problems, is a fairly common and general category, and the appropriateness and necessity of these admissions was felt to be problematic by many PROs. DRG #39, "Lens Procedures" includes mainly cataract extractions with or without the insertion of an intraoccular lens. Until the mid 1980s, cataract extraction was the second most common inpatient procedure performed on Medicare beneficiaries, accounting for over 395,000 admissions in 1984. Changes in technology (aided by intensified PRO review) have moved the majority of cataract extractions to the outpatient setting. DRGs #88, #89 and #90 were also commonly targeted by PROs; they involve chronic obstructive pulmonary disease and pneumonia, and together accounted for over 5% of Medicare admissions in 1984. These chronic conditions afflict elderly patients and cause repeated admissions. During the case studies conducted for this project, providers reported with PRO denial of these admissions, particularly in rural mining and textile manufacturing areas of the country.

The PROs attempted to focus on common problems in their states. DRGs may have been selected because the conditions were common in the Medicare population, or because medical practice standards were thought to require redirection (e.g. towards outpatient surgery). It is not possible to directly attribute changes in medical practice to PRO review alone. Based on our case studies, however, it does <u>not</u> appear that hospitals, bowing to PPS financial incentives, are pressuring physicians to change their practices. Rather, physicians and hospital administrators report that the external pressure exerted by the PROs has the greatest influence in changing medical/admitting practices.

2.2 SuperPRO Evaluation and PRO SUccess in Detecting Problems in Medical Records

As discussed above, Systemetrics, Inc., the SuperPRO, evaluates PROs' performance. Evaluation elements for the first contract period included:

- Determining the accuracy of DRG validation decisions made by PROs;
- Validating the determinations made by PROs for admission review;
- Verifying appropriate application of the PRO's admission criteria for referral of cases to physician review; and
- Identifying quality of care problems that were not addressed in the PRO's reviews.

A random sample of 400 cases was drawn for each PRO, from the list of all cases the PRO previously reviewed. (The PROs' determinations were not known to the SuperPRO reviewers in advance). The SuperPRO reviewers essentially act as a PRO for the PROs, conducting review on the selected records, much as each PRO does in its own state.

DRG validation is performed by medical records specialists, with any questions about diagnosis referred to physicians. Admissions reviews are performed by Registered Nurses, using the criteria sets developed by each PRO; any cases they feel cannot be immediately approved, are referred to physicians for further consideration. The SuperPRO RNs apply PRO criteria sets in exactly the same manner as each PRO does; this evaluation is therefore PRO-specific, to determine whether each PRO is correctly applying its own criteria for appropriateness and necessity of admissions.

Quality of care review utilizes a standardized set of generic quality "screens" applied to all PROs. Again, RNs are the first level of SuperPRO review, with any questionable cases referred to physicians. "Unlike DRG validation and admission review, this process may not replicate the type of quality review performed by the PRO...Differences in PRO and evaluator decisions on quality should not, therefore, be viewed in the same light as differences with respect to DRG determinations, admission referrals, and admission necessity determinations". In addition, the SuperPRO review of records for quality problems did not control for the level of severity of the problem. Thus a documentation problem could be weighted as heavily as a gross

medical malpractice issue. In the second round of contract evaluation, the SuperPRO evaluators attempted to control for severity of quality problems.[4]

SuperPRO evaluations are conducted on each PRO, every six months (the data used here are from the first two review cycles, covering the fist 12 months of PRO operations. Using a random sample of 400 records, the SuperPRO first determines the level of each type of problem that was present in the medical records for each PRO. The level of incorrect DRG validations is determined, as well as the percentage of records where quality of care problems were present. And the cases that require referral to physicians for review are identified, as well as the percentage of admissions that were unnecessary. The SuperPRO ratings in each of these four areas for each PRO can be compared with the actual performance of each PRO in detecting these existing problems.

Table 2 displays two types of information: the level of each type of existing problem, and the portion of the SuperPROidentified problem that each PRO successfully detected. The level of existing problems may stem from provider practices such as incorrect coding, poor quality of care, and inappropriate admissions. Problems may also stem from the PRO itself, as in the case of admission referrals, where the need to refer a case to a PRO physician for review is at issue. The SuperPRO estimation of the level of problem is presented as an index, relative to the national average, for each type of review. For example, a SuperPRO index score of 2.0 for DRG validation means that medical records examined by this PRO had twice the national average of incorrect DRG coding. A PRO detection rate of 33% for DRG validation means that the PRO identified one third of the incorrectly coded cases. A detection rate of over 100% indicates that the PRO found problems above and beyond those identified by the SuperPRO; in the SuperPRO's opinion these problems did not actually exist.

There is wide variability in both the level of existing problems and the success of PROs in detecting these problems. The PRO detection ratings are the best evaluation measure of each PRO's performance, since they quantify how much of the existing problem each PRO is able to detect.

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[4] IDEM.

TABLE 2

LEVEL OF EXISTING PROBLEM AND PRO DETECTION SUCCESS
(Based on average of cycle 1 and cycle 2)

Review Categories

PRO	DRG Changes		Admission Referrals		Necessity Denials		Quality Problems	
	SuperPRO Index*	PRO Detection Rate**	SuperPRO Index	PRO Detection Rate	SuperPRO Index	PRO Detection Rate	SuperPRO Index	PRO Detection Rate
CN	1.28	47%	.70	79%	.79	52%	.58	60%
ME	.88	18%	.86	51%	1.21	41%	.46	36%
MA	- - - - - - - - - - - - - - Waivered - - - - - - - - - - - - - -

Table 2 Continued

Review Categories

PRO	DRG Changes		Admission Referrals		Necessity Denials		Quality Problems	
	SuperPRO Index*	PRO Detection Rate**	SuperPRO Index	PRO Detection Rate	SuperPRO Index	PRO Detection Rate	SuperPRO Index	PRO Detection Rate
IOWA	.88	42%	1.17	182%	.74	15%	2.26	100%
KS	.86	43%	1.06	39%	.86	22%	1.00	31%
[illegible]	1.15	64%	1.01	54%	1.12	22%	1.22	19%
MO	.85	21%	1.20	69%	1.34	23%	1.94	45%
NB	.58	7%	1.35	43%	1.28	25%	.42	0%
ND	.73	49%	.63	124%	.69	43%	.50	23%
SD	.95	32%	1.06	122%	1.29	15%	.86	9%
AR	1.10	64%	.92	76%	.92	55%	1.54	40%
LA	1.20	46%	1.15	70%	1.22	20%	1.24	21%
OK	1.07	36%	.55	42%	.55	23%	.52	0%
TX	.97	17%	1.14	80%	1.17	57%	1.06	32%
AZ	1.07	28%	.85	56%	.86	25%	.44	14%
CO	.95	30%	.59	97%	.51	41%	.52	27%
ID	Missing							
MT	1.20	39%	1.19	43%	1.17	13%	.98	46%
NV	Missing (Late PRO Start-up)							
[illegible]	1.29	40%	.68	41%	.86	9%	1.18	0%
UT	.99	48%	.53	35%	.48	6%	.28	19%
[illegible]	1.23	43%	1.00	56%	.99	3%	.52	17%
AK	1.06	25%	1.57	31%	1.71	23%	.56	64%
CA	1.12	24%	.64	66%	.65	31%	.52	27%
HA	.88	30%	1.31	114%	.91	16%	1.04	50%
OR	.85	31%	.87	23%	.84	19%	.58	54%
WA	1.10	31%	1.21	55%	1.25	32%	.64	21%

* Index of Existing Problems, relative to National Average

** Percent of Existing Problems Correctly Identified by PRO

Source: SuperPRO Evaluations, cycles 1 and 2
Health Care Financing Administration, HSQB

When PROs are ranked on their detection success ratings for each type of review, and divided into thirds (high detection success, moderate detection success and low detection success), some patterns emerge. Several PROs rank in the top third for all four types of review, or for three out of the four types. They are Arkansas, Connecticut, Iowa, North Dakota, Rhode Island, and West Virginia. These PROs can be judged extremely successful at detecting existing problems. Several other states consistently rank in the lowest third in detecting problems in three or more of the review categories. These are Delaware, Mississippi, New Hampshire and Vermont (same PRO), New Mexico, Utah, and Virginia. These PROs are particularly unsuccessful in detecting existing problems.

Another way to compare PROs is to combine their detection success ratings across all four types of review, to achieve an overall measure of detection success. When PROs are ranked for each type of review and assigned a numeric value (High=3, moderate=2, low=1), and these values are summed across the four review categories, a maximum possible score of 12 is achievable. PROs can then be rated as to what percentage of this total maximum they achieve. Using this methodology, Table 3 groups PROs into thirds: high, moderate and low detection success, across all four review categories combined.

PROs rating high across all four review categories combined can be considered quite successful in their review of hospital records, while those rating low on all four categories combined are particularly unsuccessful.

2.3 PRO Stringency in Denying Services/Admissions

Another element in evaluating the variability in PRO performance, is the stringency with which PROs deny care that they find to be inappropriate or unnecessary. PROs perform five types of review than can result in denials, they are:

- Review of a sample of all admissions;
- Preadmission review of certain surgical procedures;
- Transfers from PPS hospitals to hospitals/units that are exempt from PPS (psychiatric and rehabilitation facilities, etc.);

TABLE 3

PRO Detection Success Across All Four Review Categories Combined
(based on average of cycle 1 and cycle 2)

HIGH (n=14)	MODERATE (n=14)	LOW (n=14)
Arkansas	Alabama	Alaska
Colorado	California	Arizona
Connecticut	Georgia	Delaware
Hawaii	Illinois	Wash. D.C.
Iowa	Kansas	Florida
Louisiana	Minnesota	Indiana
Maine	Missouri	Mississippi
Michigan	Montana	Nebraska
North Carolina	Oaklahoma	New Hampshire
North Dakota	Oregon	New Mexico
Rhode Island	South Dakota	Ohio
Texas	Wisconsin	Utah
Washington	Wyoming	Vermont
West Virginia	Kentucky	Virginia

Missing States:	
	Maryland
	New Jersey
	Massachusetts
	South Carolina
	Tennessee
	Idaho
	Nevada
	Pennsylvania

These states were either a) waivered states, b) had a PRO for only part of the contract period, or c) were missing data for either detection success or denial stringency unless both types of data were available the PRO was not included in either set of comumlative rankings.

Source: SuperPRO Evaluations, Health Care Financing Administration; HSQB.

- Transfers from PPS hospitals to other PPS hospitals; and
- Readmissions.[1]

Denial rates display the percentage of each type of reviewed (sampled) case the PRO decided to deny as being unnecessary and/or inappropriate. (Data on denial rates cover the period from each PRO's startup through September of 1986. PROs started in a staggered fashion, depending on the date on which their contracts were signed). Table 4 shows the denial rates for the five types of denials, for each PRO.

Again, there is a considerable amount of variability across PROs. There are also several PROs that show some consistency in the stringency of their denials. Arkansas, Alaska, Maine, Michigan and Nevada are in the highest third for at least four of the five denial categories. Delaware, Kentucky, Montana, New Hampshire and Vermont (same PRO), South Carolina, and Tennessee are in the lowest third for at least four of the five denial categories.

Another way to compare PROs is to combine their denial stringency ratings across all five types of denials, to achieve an overall measure of denial stringency. When PROs are ranked for each type of denial and assigned a numeric value (high=3, moderate=2, low=1), and these values are summed across the five denial categories, a maximum possible score of 15 is achievable. PROs can then be rated as to what percentage of this total maximum they achieve. Table 5 groups PROs into thirds: High, Moderate, and Low denial stringency, across all five denial categories combined.

Denial stringency indicates the percentage of reviewed cases that the PRO denied. There is no evaluative component to determine whether PROs are denying the correct services, underdenying or overdenying. Denial stringency could be interpreted as measuring the pressures imposed on hospitals by PROs. In states where the PROs are very rigorous in denying services, hospitals might be expected to quickly conform to strict standards for admissions, transfers and readmissions. In states where the PRO is less rigorous, hospitals may feel less pressure to alter their behavior.

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[1]PROs also review all cardiac pacemaker implantations and reimplantations. This category of review was exclused from Table 4 because it is a relatively minor aspect of PRO performance.

TABLE 4

PRO DENIAL RATES, BY DENIAL CATEGORIES
(PRO start-up through September, 1986)

PROs	Admission Sample	Preadmission Review	Transfers to Exempt Hospitals and Units	Transfers to Other Acute, PPS Hospitals	Readmissions
CN	3.88%	.25%	12.42%	3.14%	3.52%
ME	4.15	4.74	19.96	2.49	5.76
NH	.88	.17	0.00	1.13	1.47
RI	7.94	3.56	1.89	1.48	3.61
VT	.68	.67	0.00	.35	.65
MA	Waivered				
PA1	2.12	.82	1.71	1.02	3.05
PA2	5.62	5.31	.28	.86	1.25
NJ	Waivered				
NY	Waivered				
DC	1.75	3.27	7.69	1.08	2.86
DEL	.74	3.04	.18	.68	1.68
VA	1.76	.48	3.49	2.99	3.91
WV	9.76	.28	1.42	3.15	7.62
FL	2.96	1.88	3.91	.96	4.53
GA	4.73	1.34	7.28	1.63	2.61
NC	6.87	.84	2.28	2.63	.88
SC	.89	.86	.62	.29	1.17
MD	Waivered				
IL	3.38	3.88	2.11	1.46	4.83
IN	2.78	3.34	1.93	1.37	1.67
MIC	7.84	2.73	7.88	5.68	5.93
OH	2.21	2.57	3.54	1.48	3.83
WI	2.58	1.81	3.17	1.89	2.84
ALB	.39	.83	.92	.86	3.89
KY	.82	.38	0.00	.33	2.34
MS	2.49	.24	1.51	.74	2.88
TN	1.24	1.39	.33	.38	.53
MN	2.62	.25	6.71	.83	4.48
IOWA	.86	2.26	3.18	1.64	5.98
KS	3.89	.15	.91	1.74	2.42
MO	3.64	2.81	8.21	2.99	3.12
NB	4.89	.45	4.31	1.28	4.49
ND	6.46	.68	7.59	.89	4.81
SD	1.29	0.00	6.94	1.43	3.52

Table 4 Continued

PRO DENIAL RATES, BY DENIAL CATEGORIES

PROs	Admission Sample	Preadmission Review	Transfers to Exempt Hospitals and Units	Transfers to Other Acute, PPS Hospitals	Readmissions
ARK	6.19	.27	18.24	4.87	6.63
LA	3.21	1.16	2.96	2.39	4.53
OK	1.77	.55	6.83	.85	2.46
TX	5.75	.01	3.71	3.31	6.86
ID	2.28	4.17	11.63	1.68	2.57
NE	.93	.54	.69	1.75	1.51
CO	2.85	.18	4.25	.92	5.63
MT	1.10	.84	4.14	.67	.89
UT	.40	4.82	1.98	2.94	1.31
WY	.60	0.00	17.54	2.94	.97
AZ	2.57	2.39	5.12	1.22	1.74
NV	6.39	1.24	10.26	5.88	11.78
AK	4.00	10.11	1.85	1.89	5.62
OR	2.25	.93	32.81	1.16	2.58
WA	1.64	1.68	2.72	1.01	4.13
CA	1.53	2.22	4.73	1.03	2.35
HA	2.88	8.49	4.95	4.84	3.85

Source: PRO Denial Rates
Health Care Financing Administration, HSQB

TABLE 5

PRO Denial Stringency Across All Five Denial Categories Combined
(PRO Startup through September, 1986)

HIGH (n=14)	MODERATE (n=14)	LOW (n=14)
Alaska	Arizona	Alabama
Arkansas	Wash. D.C.	California
Connecticut	Florida	Colorado
Georgia	Iowa	Delaware
Hawaii	Minnesota	Indiana
Illinois	North Carolina	Kansas
Louisiana	Ohio	Kentucky
Maine	Oklahoma	Mississippi
Michigan	Oregon	Montana
Missouri	Rhode Island	New Hampshire
Nebraska	Utah	New Mexico
North Dakota	Virginia	South Dakota
Texas	Wisconsin	Vermont
West Virginia	Wyoming	Washington

Missing States:
Maryland
New York
New Jersey
Massachusetts
South Carolina
Tennessee
Idaho
Nevada
Pennsylvania

These states were either a) waivered states, b) had a PRO for only part of the contract period, or c) were missing data for either detection success or denial stringency unless both types of data were available the PRO was not included in either set of comumlative rankings.

Source: PRO Denials, Health Care Financing Administration; HSQB.

An alternative explanation of denial stringency is that in states where the PRO does not engage in extensive denial activity, hospitals are performing well within PRO standards for appropriate and necessary care. Only in states where hospitals provide unnecessary care would the PRO be forced to deny more services. This is the way PROs themselves apparently interpret denial rates.

2.4 PRO Problem Detection Success and Denial Stringency

During the case studies conducted as part of this project, PROs and FIs were interviewed in 10 states. PROs were asked about their SuperPRO evaluations, their denial rates, and interactions with the HCFA regarding contract renegotiation, among other topics discussed. The PROs' impressions about their SuperPRO ratings were not always consistent with the information presented above. For example, the PRO that covers both New Hampshire and Vermont felt that they were rated quite highly by the SuperPRO, particularly on quality of care problem detection. The data presented above indicates otherwise.

Several PRO representatives mentioned that the HCFA seems to focus far more on denial rates than on the SuperPRO evaluations. The feedback PROs receive as to their relative standing and performance, the HCFA's interpretation of SuperPRO and denial data, and the way this information is used in PRO contract negotiations, are unclear. PROs feel that the HCFA gives preference to PROs that a) have high denial rates (without and underlying evaluation of the appropriateness of these denials), and b) are highly rated by the SuperPRO. Table 6 presents a quantitative measure that combines these two dimensions of PRO performance.

PROs rating High on both detection success and denial stringency (across all types of reviews combined and all denial categories combined) include Connecticut, Texas, Arkansas, Louisiana, North Dakota, West Virginia, Hawaii, Michigan and Maine. Thos rating Low on both measures include Delware, New Mexico, New Hampshire and Vermont (same PRO), Mississippi, and Indiana. High ratings indicate that the PROs are successful in detecting existing problems, and that they deny a relatively high percentage of claims. Low ratings indicate that the PROs are not able to detect existing problems, and that they do not deny many claims.

TABLE 6

PRO Denial Stringency and PRO Detection Success
(PRO Denials based on PRO Startup through 9/86,
PRO Detection Success based on average of cycle 1 and cycle 2)

PRO DENIAL STRINGENCY

	PRO Detection Success		
	HIGH	MODERATE	LOW
HIGH	Connecticut Texas Arkansas North Dakota West Virginia Hawaii Michigan Maine	Georgia Illinois Missouri	Alaska Nebraska Louisiana
MODERATE	Iowa North Carolina Rhode Island	Minnesota Oklahoma Oregon Wisconsin Wyoming	Arizona Wash. D.C. Florida Ohio Utah Virginia
LOW	Washington Colorado	Alabama California Kansas Kentucky Montana South Dakota	Delaware New Mexico New Hampshire Vermont Indiana Mississippi

Missing States: Maryland
New York
New Jersey
Massachusetts
South Carolina
Tennessee
Idaho
Nevada
Pennsylvania

These states were either a) waivered states, b) had a PRO for only part of the contract period, or c) were missing data for either detection success or denial stringency unless both types of data were available the PRO was not included in either set of comumlative rankings.

Source: PRO Denials, Health Care Financing Administration; HSQB.

The PROs themselves feel that those rating High on both measures are rewarded by HCFA with speedy contract renewals, while those rating Low on both measures would find contract renewal problematic, and they feel that this is inappropriate. Our case study investigations do not necessarily support this perception about the PRO contract negotiations. For example, the PRO for New Hampshire and Vermont reported that it was the first to have their contract renewed, and reported very little difficulty in the contract renewal process. Yet this PRO rates in the lowest third for detection success and for denial stringency. While the HCFA may not be relying heavily on denial stringency, SuperPRO detection success does not appear to play a major role in determining the ease of contract renewal either.

PRO detection success would appear to be an extremely useful measure of PRO performance, because an outside entity (the SuperPRO) is applying consistent evaluation standards nationwide. A similar review of appropriateness of PRO denials would provide the other necessary element for PRO performance evaluation. The HCFA does not currently evaluate the appropriateness of denials, relying instead on hospitals' appeals mechanisms to correct any inappropriate denials. During our case studies it became apparent that this mechanism of redress may be insufficient; many hospitals, particularly small ones, find the appeals process prohibitively expensive, while other hospitals appeal virtually very denial. It would therefore seem inappropriate to rely on the appeals process to correct mistakes in PRO denials.

The information presented above demonstrates the variability across states, in PRO performance and denial stringency. The question remains as to whether such variability in defining patient DRGs, determining the appropriateness of care, detecting quality of care problems, and denying services, is appropriate in a national Medicare PPS.

3.0 FI PERFORMANCE AND EVALUATION

This section describes potential variability in FI performance, including:

- FI medical and technical denial activity;
- comparison of PRO and FI denials; and
- CPEP Evaluations and their relationship to FI denials.

3.1 FI Review Activity

FIs are responsible for coverage determinations for all Medicare patients, and for medical/utilization review for all Part A patients other than hospitalized patients. FIs are responsible for two types of reviews, which can result in denials: 1) technical denials, including denial of uncovered services, ineligible patients, incomplete or insufficient information on submitted claims, and other nonmedical circumstances; and 2) medical denials focusing on the necessity and appropriateness of services provided to Medicare beneficiaries. Prior to PPS, FIs performed medical review for all Part A services, except for the inpatient reviews conducted by PSROs; PROs replaced PSROs and now perform medical review for hospitalized patients. In the first year of PPS (FY1984), PROs were not yet functional but PSROs had largely ceased operations, so the FIs performed medical review and other PPS related reviews for hospitalized patients, in addition to medical reviews of other Part A services. The first full year of PRO medical review of hospitalized patients was therefore FY1985.

FIs do not cover specific jurisdictions such as states or regions. As mentioned earlier, providers can in some cases select the FI they wish to work with. In addition, FIs may merge, lose their HCFA contracts or go out of business. In order to measure the intensity of denial activity in each state, it is necessary to combine, or aggregate, FIs in each state. Table 7 displays the percentage of claims FIs denied, for each type of provider, by state (FIs aggregated to state level). The table is organized by region, because FIs interact with HCFA through the regional offices (unlike PROs, which each have a unique contract with the HCFA). Different regional offices may apply more or less pressure on FIs to deny services, interpret guidelines in certain ways, etc. and FI denial activity might be expected to reflect these regional differences.

Table 7A

Total Number of Inpatient Admissions
Processed and Percent Denied: 1984-1985

	1984		1985	
	Number Processed	Percent Denied	Number Processed	Percent Denied
Alabama	238,545	1.8	233,870	1.7
Arizona	124,730	.5	122,001	.4
Arkansas	168,150	1.6	151,575	.5
California	978,115	3.2	921,081	1.7
Colorado	116,530	0.0*	106,542	1.7
Connecticut	208,209	4.4	184,352	3.2
Delaware	28,078	1.0	25,451	.2
DC	60,535	.7	58,024	.4
Florida	712,945	2.6	719,994	10.7
Georgia	264,351	2.6	274,978	1.4
Hawaii	25,205	8.1	26,252	7.4
Idaho	38,289	1.4	38,844	1.2
Illinois	609,933	1.3	603,794	.8
Indiana	268,849	1.4	252,573	1.3
Iowa	208,947	1.2	185,663	.6
Kansas	118,442	1.5	112,163	.7
Kentucky	201,345	4.7	204,929	5.3
Louisiana	195,494	3.7	205,359	2.2
Maine	62,283	1.8	59,552	.9
Maryland	166,137	2.8	157,871	6.7
Massachusetts	292,195	4.3	259,938	3.7
Michigan	424,649	.2	355,787	.1
Minnesota	196,643	2.0	164,995	2.1
Mississippi	171,829	.2	168,539	.1
Missouri	343,982	0.0	363,046	0.0
Montana	39,972	1.7	37,328	1.7
Nebraska	420,091	1.2	397,408	1.3
Nevada	40,303	1.6	38,993	2.9
New Hampshire	67,432	2.4	65,529	3.7
New Jersey	344,416	9.3	351,845	.9
New Mexico	54,812	2.8	64,660	17.1
New York	958,812	5.7	1,156,658	3.8
North Carolina	287,077	3.2	257,828	2.7
North Dakota	50,467	4.3	44,803	2.4
Ohio	513,756	.7	515,157	1.1
Oklahoma	153,014	.7	144,891	.9
Oregon	126,683	1.2	114,377	.7
Pennsylvania	740,564	2.5	700,091	2.3
Rhode Island	49,317	.7	52,164	1.9
South Carolina	127,193	1.6	132,276	.2
South Dakota	**	**	**	**
Tennessee	311,425	.8	296,040	.5
Texas	613,153	6.6	523,268	8.0
Utah	40,789	.9	39,706	.3
Vermont	**	**	**	**
Virginia	208,172	1.1	208,413	.8
Washington	186,385	1.4	183,729	2.0
West Virginia	128,406	2.6	122,331	.1
Wisconsin	243,873	.7	220,084	.2
Wyoming	15,751	.8	13,832	0.0

* 0.0 = less than 0.05% of claims denied.
**claims processed by an FI in another state.

Table 7B

Total Number of HHA Claims
Processed and Percent Denied: 1984-1985

	1984		1985	
	Number Processed	Percent Denied	Number Processed	Percent Denied
Alabama	73,223	.8	84,425	.7
Arizona	4,380	.2	6,580	.3
Arkansas	26,229	4.2	29,609	3.1
California	310,925	1.5	376,783	3.2
Colorado	78,027	1.7	50,889	2.8
Connecticut	97,227	1.5	99,937	4.3
Delaware	22,549	0.0	22,594	1.2
DC	32,835	3.4	34,821	1.9
Florida	307,320	.3	322,336	1.0
Georgia	59,360	2.5	55,622	3.6
Hawaii	6,300	.4	7,452	.7
Idaho	17,779	.4	21,870	.1
Illinois	248,508	3.8	259,330	6.8
Indiana	66,651	.3	77,683	3.2
Iowa	71,218	.9	159,541	2.0
Kansas	41,032	.4	40,301	3.3
Kentucky	60,880	.3	74,758	.4
Louisiana	64,162	3.5	76,296	3.0
Maine	28,006	.9	23,930	1.4
Maryland	61,052	2.6	66,308	8.3
Massachusetts	217,784	1.1	159,415	5.2
Michigan	214,758	.8	257,177	1.1
Minnesota	34,182	2.6	34,398	3.5
Mississippi	125,571	1.8	130,457	1.9
Missouri	205,202	.3	212,643	.7
Montana	13,607	0.0	13,651	.1
Nebraska	32,649	1.1	45,459	1.5
Nevada	23,012	2.7	23,512	3.5
New Hampshire	46,485	1.3	47,552	.7
New Jersey	198,905	3.5	369,133	.7
New Mexico	21,725	1.6	22,978	4.0
New York	356,591	1.1	389,668	1.0
North Carolina	103,378	.7	104,684	.7
North Dakota	7,184	1.4	8,414	3.0
Ohio	167,190	1.9	181,685	3.1
Oklahoma	42,310	4.1	43,483	4.3
Oregon	46,207	0.0	57,350	.1
Pennsylvania	570,946	1.3	700,901	1.9
Rhode Island	34,898	.4	28,721	1.0
South Carolina	70,442	2.0	81,056	3.5
South Dakota	**	**	**	**
Tennessee	150,425	1.5	170,531	1.0
Texas	195,672	.9	230,044	1.1
Utah	17,843	12.1	23,101	8.1
Vermont	**	**	**	**
Virginia	57,725	.2	11,310	1.3
Washington	63,898	.7	64,904	.5
West Virginia	31,313	.3	43,675	.2
Wisconsin	87,178	5.9	96,224	8.9
Wyoming	6,977	.2	6,792	.5

* 0.0 = less than 0.05% of claims denied.
**claims processed by an FI in another state.

Table 7C

Total Number of SNF Claims
Processed and Percent Denied: 1984-1985

	1984		1985	
	Number Processed	Percent Denied	Number Processed	Percent Denied
Alabama	7,047	.2	6,403	1.4
Arizona	2,037	28.9	2,898	22.0
Arkansas	282	19.9	2,608	6.7
California	79,662	28.3	73,503	21.5
Colorado	4,185	2.7	6,623	5.7
Connecticut	5,435	100.0	2,581	100.0
Delaware	1,991	40.7	1,751	31.8
DC	1,342	26.5	1,127	34.4
Florida	88,002	26.7	85,919	28.7
Georgia	3,959	39.4	3,656	21.5
Hawaii	2,437	48.8	2,451	44.4
Idaho	4,751	50.8	4,798	48.8
Illinois	87,423	11.4	78,166	12.8
Indiana	14,134	19.5	19,538	12.2
Iowa	4,278	8.8	11,645	3.5
Kansas	1,763	5.1	3,974	5.5
Kentucky	11,828	42.9	11,368	47.6
Louisiana	2,495	14.3	6,182	8.8
Maine	1,204	1.6	1,272	4.2
Maryland	2,891	56.3	2,732	100.0
Massachusetts	9,292	25.1	7,025	29.5
Michigan	46,926	39.1	38,400	38.7
Minnesota	7,820	71.2	8,141	72.9
Mississippi	371	0.0	1,423	1.6
Missouri	16,460	0.0	21,368	.3
Montana	2,902	41.9	2,961	28.4
Nebraska	74,158	32.4	80,801	31.7
Nevada	6,549	8.8	6,012	9.8
New Hampshire	3,159	41.4	1,999	60.0
New Jersey	18,805	54.0	15,657	81.4
New Mexico	909	12.0	1,108	21.2
New York	109,029	56.5	98,679	63.6
North Carolina	13,202	61.5	12,203	39.8
North Dakota	2,989	56.1	1,771	3.6
Ohio	44,209	13.5	42,460	13.0
Oklahoma	973	0.0	2,119	1.2
Oregon	6,694	21.4	7,216	21.1
Pennsylvania	93,966	42.1	94,654	39.4
Rhode Island	5,896	45.5	3,788	70.1
South Carolina	9,179	15.8	11,122	6.5
South Dakota	**	**	**	**
Tennessee	13,200	1.4	13,490	.2
Texas	5,423	5.5	6,247	11.1
Utah	4,128	.8	3,985	.5
Vermont	**	**	**	**
Virginia	6,836	11.5	6,957	11.8
Washington	17,045	21.6	13,967	26.4
West Virginia	5,002	34.0	5,131	29.5
Wisconsin	7,224	22.8	10,010	11.2
Wyoming	14	0.0	300	2.0

* 0.0 = less than 0.05% of claims denied.
**claims processed by an FI in another state.

The regional averages of percent of claims denied (presented in Table 7) are weighted by the volume of claims processed in each state. For each type of provider there are indeed wide variations in the percent of claims denied, across states and across regions. The Mid Atlantic region has the highest rate of denials for total claims, SNF claims and other miscellaneous claims. (This region includes only three states, two of which had waivers from PPS; the alternative reimbursement systems operating in those states might contribute to the high denial rates). The Northeast region has the lowest rate of denials for inpatient claims, while the West South Central region has more than five times as high a denial rate. The West South Central region also has more than six times the denial rate for outpatient claims as the West North Central region.

It is not clear why such differences exist; there are at least four possible explanations: 1) differences in local provider practices require more or less vigilance on the part of the FI, 2) FIs in some states are more rigorous and stringent than FIs in other states, 3) FIs may interpret HCFA regulations differently, or 4) differences in HCFA regional offices' interactions with FIs result in more pressure being felt by FIs in some regions than in others. In addition, FIs with low claims volume may lack the experience required to make appropriate review determinations. In any case, this table on FI denial stringency does suggest the pressures experienced by providers in different states and different regions. Whether this variation in denials is appropriate is impossible to ascertain, without a method of evaluating the appropriateness of the denials, and no such method currently exists.

It is important to consider FI denials for inpatient vs. all other providers separately. The PPS contains incentives to minimize hospitalization, substituting care in other, less expensive settings. Concern was expressed by providers in many of the case study sites that FIs and PROs are "tough" on hospital care and deny a lot of these claims, and at the same time the FIs are "tough" on other services as well, leaving no avenue for service substitution. Table 8 displays FI denial rates for inpatient care and denial rates for all other services. Providers in states with high denial rates in both categories fear that excessive denials may limit services to an inappropriate degree, eventually harming quality of care for Medicare

TABLE 8

FI Inpatient Denials and Other FI Denials
(Based on average of 1984 and 1985 Denial Rates)

Percent of Inpatient Claims Denied

PERCENT OF OTHER CLAIMS DENIED a

	HIGH	MODERATE	LOW
HIGH	Florida	Idaho	Colorado
	Louisiana	Indiana	Michigan
	Maryland	Nebraska	Oklahoma
	Massachusetts		Wisconsin
	New Mexico		Wash. D.C.
	New York		Delaware
	North Dakota		
MODERATE	Connecticut	Alabama	Ohio
	Hawaii	Arkansas	South Carolina
	Kentucky	Georgia	New Jersey
	North Carolina	Minnesota	
	Pennsylvania	Montana	
	Texas	Oregon	
		Washington**	
LOW	California	Illinois	Arizona
	Nevada	Kansas	Tennessee
	New Hampshire*	Maine	Utah
		Rhode Island	Wyoming
		Virginia	Iowa***
		West Virginia	Mississippi
			Missouri

*Includes Vermont
**Includes Alaska
***Includes South Dakota

a) All other claims includes: outpatient, SNF, HHA, and other miscellaneous claims.

Source: FI Denials, Health Care Financing Administration; BPO.

beneficiaries. The states where this concern is greatest are: Florida, Louisiana, Maryland, Massachusetts, New Mexico, New York, and North Dakota (note that three of these states were amont the four states with waivers from PPS). Again, it is not possible to ascertain whether providers in these state require greater supervision and oversight by the FIs, or whether the FIs are in fact more stringent than in other states.

3.2 PRO and FI Denials

Section 3.1 described FI denial stringency. Because both FIs and PROs can deny claims, it is also important to assexx the combined denial stringency of these two administrative agencies, in each state. Because PROs review inpatient records exclusively, the combination of PRO inpatient denials and FI inpatient denials is examined here. Again, denial stringency has two possible interpretations (truly stringent administration vs. inappropriate provider practices). However, it is possible to suggest the pressure experienced by providers, through the denial mechanism, in each state.

Table 9 displays states that have High PRO denial stringency and High FI inpatient denial rates as well. These states are: Connecticut, Hawaii, Louisiana, Nevada, North Dakota and Texas. Whether the high denials rates are due to FI/PRO rigor or inappropriate provider practices, hospitals in states ranking High on both types of denials probably experience the greatest pressure to reduce services and/or conform to the guidelines of the administrative agencies. These hospitals can be expected to spend more time and effort in documenting services, interacting with PROs and FIs, appealing denials, etc. Physicians in these states may also feel more pressure to alter their medical/admitting practices, conform to guidelines, determine eligibility and necessity before ordering services, etc. This cumulative denial "burden" is one way of identifying states where hospitals (and by extension physicians) are under the most pressure to alter their standard medical/administrative practices.

3.3 CPEP Evaluations and FI Denials

The HCFA system for evaluating FIs is called the Contractor Performance Evaluation Program (CPEP), and is conducted by the HCFA Regional Offices each year. FIs are each assessed and scored on a wide variety of

TABLE 9

FI Inpatient Denials and Pro Denial Stringency
(FI Denials Based on average of 1984 and 1985 rates,
PRO Denial Stringency based on average of cycle 1 and cycle 2)

Percent of Inpatient Claims Denied by FI

PRO (INPATIENT) DENIAL STRINGENCY

	HIGH	MODERATE	LOW
HIGH	Connecticut Hawaii Louisiana Nevada North Dakota Texas	Arkansas Georgia Idaho Illinois Maine Nebraska West Virginia	Michigan Missouri
MODERATE	Florida North Carolina	Minnesota Oregon Rhode Island Virginia Washington	Arizona Wash. D.C. Iowa Ohio Oklahoma Utah Wisconsin Wyoming
LOW	California Kentucky New Hampshire New Mexico Pennsylvania	Alabama Indiana Kansas Montana	Colorado Delaware Mississippi South Carolina Tennessee

Missing States: Maryland, New York, New Jersey and Massachusetts were waivered, and Alaska, South Dakota and Vermont were handled by FIs in other states.

Source: FI Denials: Health Care Financing Administration; BPO
PRO Denials: Health Care Financing Administration; HSQB

performance parameters, which differ each year. Table 10 displays the CPEP evaluation elements/criteria for 1983, 1984, and 1985. 1983 was the TEFRA year; 1984 was the first year of PPS when FIs performed reviews later undertaken by PROs (PROs were not fully operational until 1985); and 1985 was the first year that the PPS was administered by PROs and FIs in the manner Congress originally intended. It is interesting to note the extent to which CPEP elements were altered in 1985; the level of detail overwhelms that of previous years.

The goal of any evaluation program is to discriminate the successful performers from those with poor performance, so that remedial action can be undertaken with the latter group. The differing CPEP evaluation standards across years makes it difficult to assess an FI over time, other than simply examining the overall scores each year. The overall score indicates the percent of the maximum possible score each FI achieved. Table 11 displays CPEP overall scores and ranges.

The range, or distribution, each year was extremely narrow. For example, nearly 80% of all FIs scored within a 6 point range in 1983; 73% scored within a 6 point range in 1984; and 65% scored within an 8 point range in 1985. (The very small standard deviations indicate this lack of "spread" as well). Even in 1985, with the wealth of detailed information available for scoring, the standard deviation was no greater than in previous years, indicating a continuing inability of the CPEP to discriminate among FIs.

There are two interpretations of this inability of the CPEP to differentiate top performers from poor performers. It may be that the CPEP instrument itself, and the way it is administered by the HCFA regional offices, is a poor evaluation tool. The individual elements, as well as the overall instrument, may be too subjective and/or too fragmented, so that when a total score is compiled, it has little meaning.

An alternative explanation is that the CPEP correctly indicates the similarity of FI performance nationwide. After many years of operations, with all FIs having essentially the same functions, they may be so similar as to make their performance virtually indistinguishable, one from another. One could argue that this is indeed the goal of a nationwide FI program: consistent and uniform performance.

TABLE 10

CPEP EVALUATION ELEMENTS/CRITERIA

1983

I. Bill Processing
- A. Control of Provider Bills
- B. Correct Coverage
- C. Utilization Determinations
- D. Inquiries/Appeals

II. Provider Reimbursement
- A. Interim & PIP Rates
- B. Cost Reimbursement
- C. Timely Settlement Cost Reports

III. Contract Management
- A. Control of Expenditures
- B. Recl. Rects/Bank Accounts
- C. Program Integrity
- D. Contract Provisions
- E. Compliance

IV. Statistical Standards
- A. Unit Cost of Claims Processing
- B. Timeliness of Claims Processing
- C. Quality of Cost Report Settlement

1984

I. Bill Processing
- A. Bill Control/Initiatives
- B. Transmit Info. to HCFA
- C. Bene/Provider Inquiries
- D. Coverage/Payment Det.
- E. HMA Coverage/Compliance
- F. Utilization Review Process
- G. Hospital Discharge Data

II. Provider Reimbursement
- A. Interim & PIP Rates
- B. Overpayment
- C. Cost Reimbursement
- D. Time/Settlement Cost Reports

III. Contract Management
- A. Control of Expenditures
- B. Budget Req/Fiscal/Reports
- C. Program Integrity
- D. Subcontracts/SADBUS
- E. HCFA Inst.

IV. PPS Medical Review
- A. Review Admits/Transfers/DRGs
- B. Rev. Admits/Transfers for Necessity
- C. Cost Outliers, Admit. Monitoring Rot.

V. PPS Base Year Audit
- A. Notify Prov. of Target Amount
- B. PPS Target Amount

1985

I. Bill Processing
- A. Bill Control
- B. Inpatient Utilization Edits
- C. Outpatient Utilization Edits
- D. SNF Utilization Edits
- E. ESRD Payment
- F. Bill Proc. Time-Inpatient
- G. Bill Proc. Time-Outpatient
- H. Bill Proc. Time-SNF
- I. Bill Proc. Time-[illegible]
- J. DMOM - 30
- K. Unit Cost

II. Beneficiary Services
- A. Bene. Inquiry Accuracy
- B. Bene. Inquiry Timely
- C. Accurate Recons.
- D. Recon Notices

III. Provider Services
- A. Prov. Inquiry Timely
- B. Prov. Inquiry Accuracy

IV. Productivity Investments
- A. EMC-Volume
- B. EMC-Format
- C. PRO Data
- D. UNIBILL
- E. System Enhancements

V. Payment Safeguards-Bill Processing
- A. Non-PPS Waivers
- B. PPS Waivers
- C. MSP-Working Aged
- D. MSP-Liability
- E. Fraud & Abuse
- F. Blended Payment
- G. Sanctioned Providers

TABLE 10 Continued

CPEP EVALUATION ELEMENTS/CRITERIA

1985 Continued

VI. Payment Safeguards-Prov. Reimburs
- A. Interim Payments-Hosp
- B. Interim Payments-SNF
- C. Interim Payments-HHA
- D. PPS Interim Rates
- E. HCFA - 91
- F. Late Cost Reports
- G. Overpayment Incidence - Hosp.
- H. Overpayment Incidence - SNF
- I. Overpayment Incidence - HHA
- J. Interest Penalties
- K. Overpayment Recovery Timely
- L. Finalize Cost Reports - Hosp
- M. Finalize Cost Reports - SNF
- N. TEFRA Audits
- O. Finalize Cost Reports - HHA
- P. Cost Effectiveness Audit
- Q. Fraud & Abuse Audit
- R. CRST - Hosp
- S. CRST - SNF
- T. CRST - HHA

1985 Continued

VII. Payment Safeguards - Medical Review
- A. Inpatient Hosp. M/R Level
- B. Outpatient Hosp. M/R Level
- C. HHA M/R Level
- D. CORF M/R Level
- E. SNF M/R Level
- F. EMC M/R Level
- G. Outpatient Correct M/R
- H. HHA Correct M/R
- I. SNF Correct M/R
- J. CORF Correct M/R
- K. EMC Correct M/R
- L. Rank HHAs
- M. Review HHAs
- N. HHA Coverage Compliance Review
- O. HHA Prepayment M/R
- P. Cost Effectiveness MR/UR
- Q. Reports Benefits Saved Timely

IX. Contract Management
- A. Subcontracts
- B. SADBUS Goals
- C. HCRIS-Accuracy
- D. HCRIS-Timely
- E. IBPR-Accuracy
- F. IBPR-Timely
- G. Overpayment Data-Accuracy
- H. Overpayment Data-Timely
- I. HCFA 411-Accuracy
- J. HCFA 411-Timely
- K. ESRD Cost Report-Accuracy
- L. ESRD Cost Report-Timely
- M. Central Office Compliance
- N. Regional Office Compliance

1985 Continued

VIII. Fiscal Management
- A. Cost Allocations
- B. Control Oper. Expenc.
- C. Control MR/UR Expenc.
- D. Control Prov. Audit Expenc
- E. Control PI Expenc
- F. Admin. Funds
- G. Budget Request-Accuracy
- H. Budget Request-Timely
- I. POE Reports-Accuracy
- J. POE Reports-Timely
- K. IER-Accuracy
- L. IER-Timely
- M. Var. Report-Accuracy
- N. Var. Report-Timely
- O. TAA-Accuracy
- P. TAA-Timely
- Q. FACP-Accuracy
- R. FACP-Timely

Source: CPEP Evaluation Manuals
Health Care Financing Administration; BPO

TABLE 11

FI Overall CPEP Scores

	1983 (n=72)	1984 (n=67)	1985 (n=62)
Minimum Score*	84%	77%	68%
Maximum Score*	100%	100%	93%
Average	84%	92%	86%
Standard Deviation	.03	.04	.04

*Percent of Total Maximum Possible

Source CPEP Scores, Health Care Financing Administration; BQC.

4.0 INTERSTATE DIFFERENCES IN UTILIZATION AND DENIALS

This chapter of the report examines the relationship between the denial activity of FIs and utilization of services.

4.1 Relationship of Denials and Utilization

In theory, denials of services may directly affect covered utilization in several ways. In the current period, higher levels of denials would obviously reduce paid claims. But otherwise, a stringent, rigorous denial approach by FIs and/or PROs might indirectly decrease utilization because the knowledge that administrative agents are "tough" and will deny certain services for some types of patients may lead providers to refrain from providing these services. Or, high denial levels may cause providers to increase use levels in an effort to achieve a target income or revenue level.

Whatever the direction and timing of effects of PRO/FI denial policies, there seems to be agreement that such policies are important determinants of observed levels of covered (paid) services. During case studies conducted for this project in 10 communities across the country, physicians and hospital administrators reported that the external pressure exerted by PROs and FIs has a great influence in changing medical practice patterns and limiting admissions, rather than the PPS financial incentives per se.

There are several reasons why individual PROs and FIs may deny more services than their peers. First, PRO contracts are considered for recompetition every two years; contract renewal without recompetition rests on performing to HCFA standards, which may favor high rates of denials (as reported by many PRO case study respondents). FIs similarly must perform to HCFA's CPEP standards, perhaps leading them to deny more services. Second, providers in some states may have a practice style that includes many inappropriate or unnecessary services, and PROs and FIs must deny more services in order to counter these inappropriate provider practices. Lastly, the PRO and/or FI may be incorrectly denying some care, i.e. denying services that were medically necessary.

4.2 Data

This analysis uses denial and utilization data for inpatient services, SNF services and HHA services, for each state, to identify the relationship between denial activity and utilization. In addition, a SuperPRO measure was employed for the inpatient analyses. That measure is developed from a sample of PRO-reviewed records, and reflects the percent of Medicare hospital admissions that were inappropriate, in the opinion of the SuperPRO.

HCFA's data on denials of claims are available for each FI, for Federal Fiscal Years 1984 and 1985. Prior to 1984, HCFA collected the data but did not maintain it in a manner that permits ready access. These FI denials include claims the PROs have determined should be denied; therefore, denials include two types of denied claims; those denied by the FI and those denied by the PROs. The analysis also includes Part A claims denied for HHAs, SNFs and hospitals. The denials were aggregated to the state level, in order to compare to state utilization data.

A denial results when an entire claim is denied; denial of only part of a claim, and partial payment occurs, is counted as a paid claim. For non-acute inpatient services (rehabilitation, psychiatric, drug and alcohol treatment facilities) more than one claim is likely to be generated for each admission. HCFA's FI denial data do not separate acute from non-acute admissions; all analyses therefore concern total Medicare covered inpatient services, acute and non-acute, combined. The utilization data similarly combine acute and non-acute inpatient claims.

For SNF admissions, there could be up to two claims for a single admission, since Medicare covers up to 60 days of SNF care and most SNF's bill monthly. For HHAs the number of services (visits) per claim varies widely, and the frequency of billing may be changing over time. Thus, the denial rate for HHAs measures only the fraction of submitted bills that were denied in their entirety; obviously, this only imperfectly measures the extent of some services and some visits.

Per capita utilization of Medicare services for 1983 through 1986 were used to measure utilization. For each year, Part A Medicare enrollment figures, by state, are used for the denominators, while counts of services are

used for the numerators. The use measures are:

- Inpatient Hospital Admissions, both acute and non-acute;
- SNF Admissions; and
- HHA Visits.

The percent of acute inpatient admissions which the SuperPRO deemed to be of questionable medical necessity was used for the inpatient analyses, to control for interstate differences in inappropriate admissions. That is, of the medical records each PRO reviewed to determine the necessity of an acute inpatient admission, the SuperPRO found a certain percentage to be unnecessary admissions. This measure indicates the percentage of acute, inpatient admissions that should rightly be denied, because of problems in provider practices, rather than any activity of the PROs. The measure is useful because a single national criteria set was used for all states. This measure was included in the analyses to control for the level of existing deniable problems in inpatient care in each state. Table 12 displays this SuperPRO measure of unnecessary denials, by state, for 1985.

4.3 Interstate Variation in Per Capita Utilization and in Unnecessary Admissions

Table 13 (a-c) displays the level of inpatient admissions (Table 13a), SNF admissions (Table 13b), and HHA visits (Table 13c), by state, for 1983 through 1986. Nationally, the average number of hospital admissions per thousand beneficiaries went from 402 admissions in 1983 to 333 admissions in 1986. However, there is great variability among the states in any given year. In 1986, for example, inpatient admissions ranged from 237 in North Carolina to 440 in Tennessee.

SNF admissions and home health visits increased during this time period. The average number of SNF admissions per thousand beneficiaries went from 9 admissions in 1983 to 11 admissions in 1986. HHA visits per thousand beneficiaries went from 1067 visits in 1983 to 1191 visits in 1986. Interstate variability also exists for these measures. The number of SNF admissions per thousand beneficiaries in 1986 ranged from 4 in Massachusetts to 27 in Utah. And, the number of HHA visits per thousand beneficiaries in 1986 ranged from 348 in Arizona to 3600 in Mississippi.

Table 12

Percent of Acute Inpatient Admissions Identified by the SuperPRO as Being of Questionable Medical Necessity--1985

National Average	10.48
Alabama	10.45
Alaska	18.20
Arizona	9.20
Arkansas	9.75
California	6.90
Colorado	5.40
Connecticut	8.40
Delaware	7.55
DC	9.90
Florida	12.75
Georgia	12.50
Hawaii	9.70
Idaho	13.50
Illinois	23.55
Indiana	11.75
Iowa	7.85
Kansas	9.20
Kentucky	7.05
Louisiana	13.00
Maine	12.85
Maryland	--
Massachusetts	--
Michigan	12.85
Minnesota	11.90
Mississippi	11.90
Missouri	14.30
Montana	12.50
Nebraska	13.60
Nevada	10.80
New Hampshire	11.50
New Jersey	10.00
New Mexico	9.20
New York	--
North Carolina	7.45
North Dakota	7.40
Ohio	12.30
Oklahoma	5.85
Oregon	8.90
Pennsylvania	9.10
Rhode Island	9.70
South Carolina	6.90
South Dakota	13.70
Tennessee	10.00
Texas	12.45
Utah	5.15
Vermont	11.40
Virginia	10.50
Washington	13.35
West Virginia	10.55
Wisconsin	7.35
Wyoming	10.50

Note: Numbers reported averaged over 2 SuperPRO review cycles.
Source: SuperPRO Evaluations, Health Care Financing Administration, HSQB.

4.4 Regression Models

Two propositions are tested for, for each of the three types of service utilization (inpatient admissions, SNF admissions and HHA visits). The first is that the level of utilization in 1986 is affected by the denial rate in a state; and second, that the change in utilization is affected by the denial rate. The general model to test the first proposition is:

$$\text{Utilization}_t = f(\text{Utilization}_{1983}, \text{Denial Rate}) + E, \text{ where}$$

the denial rate is measured in three different ways:

D_t The denial rate in the same year;

D_{t-1} The denial rate in the previous year; and

D_t, D_{t-1} The present year and the previous year's denial rate.

The second model specifies the rate of change in utilization as a function of the same independent variables, thus:

$$\frac{\text{Utilization}_t - \text{Utilization}_{t-1}}{\text{Utilization}_{t-1}} = f(\text{Denial rate}) + E,$$

where the same three measures of denials are used.

The utilization level for a base period (1983) is used in the first model in which the dependent variable is the absolute level of utilization to control for state variation in practice patterns and availability of services. In addition, the SuperPRO variable is included in the inpatient models to account for variation in unnecessary admissions.

The models using current period denials (D_t) are estimated using 1984 and 1985 utilization. The models using lagged denials (D_{t-1}) are estimated on utilization data for 1985 and 1986. And, the model using both lagged and current denials uses data for 1985 alone.

4.5 Statistical Results

Table 14 displays the results of the regression models described above. An Appendix contains full model results.

When the six regression models were run with inpatient utilization data, none of the regression coefficients were significant, although the signs were in the expected direction (an increase in denial activity resulting in a decrease in utilization). That is, these data are unable to confirm that

variation in denial activity accounts for any of the observed variation in inpatient utilization.

When the six regression models were run with SNF utilization data, results were mixed. The coefficients are generally in the expected direction, but are significant for only two of the three models. An increase in the percent of claims denied in the same year appears to account for a very small decrease in utilization. This finding is strengthened because there is the opportunity for two denials per admission, for some portion of admissions; in essence a "double count" of claims (and possible denials) for some admissions. If only one claim could be generated per admission, we would expect a stronger relationship between denials and SNF utilization.

The fact that results were significant for the impact of current period denials and lagged denials, but not for the model combining the two denial periods, is perplexing, and leads us to question the ability of the data, with existing measurement problems, to provide useful results.

Results are also mixed when the regression models are run for HHA data. For the most part the signs are not in the expected direction and coefficients are not significant. While SNF findings were significant for denials in the current period and in the prior period, but not for the combined model with both denial rates, the reverse was true for HHA, i.e. significant results were found only for the combined.

There are measurement problems with the HHA data, because a claim can have a single service or many; and, an entire claim must be denied in order to be counted as one denial. In addition, HHAs are submitting claims more often (meaning each claim has fewer services on it, but two or more claims are generated where one was previously) than in the past. We do not know the average number of visits per claim, the average number of claims filed per month for each beneficiary, or other critical parameters that would improve data interpretation. For these reasons, we are reluctant to accept the mixed and somewhat contradictory HHA findings.

Table 13A

Inpatient Admissions by State
1983-1986
(per 1000)

	1983	1984	1985	1986
National Average	401.7	384.3	351.3	333.1
Alabama	485.1	431.1	377.7	395.0
Alaska	*	*	*	*
Arizona	347.1	336.3	315.8	311.9
Arkansas	478.7	446.8	396.8	378.4
California	344.4	334.5	301.0	297.1
Colorado	390.0	341.8	316.6	290.1
Connecticut	307.3	313.1	277.1	255.0
Delaware	328.4	329.9	302.4	310.5
DC	469.0	461.5	442.4	414.4
Florida	400.8	375.5	327.8	316.6
Georgia	453.8	443.3	408.2	395.6
Hawaii	*	*	*	*
Idaho	338.1	311.8	294.7	263.4
Illinois	402.4	392.1	370.1	337.6
Indiana	416.3	405.5	322.3	324.9
Iowa	415.1	359.9	323.6	306.4
Kansas	437.1	400.5	360.5	338.1
Kentucky	434.7	406.6	405.4	400.9
Louisiana	460.0	453.9	446.8	417.8
Maine	378.8	374.9	345.8	317.3
Maryland	366.6	370.8	324.1	312.9
Massachusetts	375.4	374.9	347.5	320.3
Michigan	393.0	383.6	346.9	316.7
Minnesota	420.9	373.9	310.8	288.0
Mississippi	501.5	476.6	438.1	425.2
Missouri	448.2	430.5	415.6	373.1
Montana	405.6	378.8	338.6	354.8
Nebraska	476.8	429.2	360.2	331.4
Nevada	395.5	365.9	331.8	289.8
New Hampshire	354.0	341.3	317.8	308.4
New Jersey	331.8	327.0	308.8	304.3
New Mexico	352.8	344.7	321.0	307.7
New York	329.3	328.6	313.6	295.9
North Carolina	393.6	352.9	333.5	236.9
North Dakota	532.2	523.8	435.8	421.5
Ohio	398.4	394.3	362.7	375.3
Oklahoma	442.0	418.5	367.0	345.5
Oregon	352.7	336.2	298.0	268.1
Pennsylvania	388.5	389.0	367.4	358.7
Rhode Island	318.3	324.2	305.4	309.9
South Carolina	362.2	355.3	326.1	344.1
South Dakota	466.5	448.9	408.7	400.2
Tennessee	515.9	506.6	446.1	440.2
Texas	469.4	447.6	390.4	350.0
Utah	320.2	293.1	328.4	290.7
Vermont	356.3	342.8	307.9	309.4
Virginia	393.5	371.6	392.2	292.9
Washington	347.8	334.8	290.8	272.3
West Virginia	458.2	434.3	392.6	365.3
Wisconsin	374.5	356.4	313.3	306.9
Wyoming	353.2	353.3	339.6	332.6

*Alaska and Hawaii enrollment counts were unavailable, preventing calculation.
Source: Medicare Beneficiary - Year File, AAI Care Database

Table 13B

SNF Admissions by State
1983-1986
(per 1000)

	1983	1984	1985	1986
National Average	9.1	10.0	11.4	11.4
Alabama	14.4	15.0	18.0	16.4
Alaska	*	*	*	*
Arizona	7.6	8.3	8.6	9.7
Arkansas	1.8	3.4	12.0	10.5
California	17.3	18.5	20.6	19.6
Colorado	6.2	8.7	15.1	19.4
Connecticut	10.2	11.8	11.1	8.6
Delaware	9.2	8.8	9.9	5.8
DC	6.6	6.6	4.5	5.2
Florida	13.6	13.9	12.9	10.8
Georgia	7.1	7.0	6.4	5.5
Hawaii	*	*	*	*
Idaho	14.3	14.6	18.9	14.1
Illinois	16.9	17.5	14.1	11.5
Indiana	13.5	14.6	15.8	14.7
Iowa	6.7	12.0	24.4	25.2
Kansas	4.9	7.3	13.1	17.2
Kentucky	11.0	10.4	9.7	10.4
Louisiana	4.0	4.9	11.2	12.8
Maine	5.5	5.5	5.1	4.3
Maryland	6.6	6.0	4.4	4.8
Massachusetts	4.7	4.3	4.3	3.9
Michigan	15.0	15.2	14.6	13.2
Minnesota	5.4	6.6	9.9	9.8
Mississippi	.8	1.8	5.4	6.7
Missouri	10.0	13.4	18.4	18.1
Montana	14.0	15.5	19.1	23.5
Nebraska	8.8	10.3	16.0	19.6
Nevada	11.3	12.9	10.5	11.2
New Hampshire	8.8	8.4	7.9	7.1
New Jersey	8.3	7.4	5.5	4.4
New Mexico	2.7	5.4	6.4	8.3
New York	8.9	8.5	8.4	9.0
North Carolina	6.6	7.4	7.2	6.1
North Dakota	19.8	21.0	23.8	19.2
Ohio	13.7	13.3	10.0	10.2
Oklahoma	3.4	4.2	6.9	9.7
Oregon	8.5	9.3	9.9	7.6
Pennsylvania	15.6	17.3	16.6	13.6
Rhode Island	11.7	12.0	10.4	10.4
South Carolina	9.1	9.2	8.0	7.1
South Dakota	3.2	5.7	7.9	8.9
Tennessee	9.3	11.4	13.1	13.2
Texas	3.4	4.0	5.3	7.8
Utah	20.4	22.5	24.0	27.4
Vermont	6.1	5.6	6.1	7.6
Virginia	6.1	7.3	6.6	6.5
Washington	16.7	16.2	12.3	11.4
West Virginia	6.3	6.5	6.7	6.6
Wisconsin	7.5	10.1	11.8	11.6
Wyoming	2.3	3.9	9.5	13.3

Table 13C

HHA Visits by State
1983-1986
(per 1000)

	1983	1984	1985	1986
National Average	1067.1	1196.5	1267.1	1191.3
Alabama	1324.0	1482.8	1785.0	2041.2
Alaska	*	*	*	*
Arizona	321.5	471.0	536.1	347.7
Arkansas	765.5	840.5	911.3	902.5
California	949.7	935.3	1046.5	990.0
Colorado	1305.6	1202.0	1195.4	995.6
Connecticut	1950.4	2006.7	2038.2	1783.7
Delaware	1673.7	2682.6	2412.0	2035.2
DC	1209.5	1251.7	1221.3	1206.6
Florida	1370.9	1847.9	1788.6	1552.9
Georgia	946.8	997.3	1193.8	1281.7
Hawaii	*	*	*	*
Idaho	668.9	1146.2	1571.3	892.4
Illinois	894.3	1111.3	1240.3	1102.4
Indiana	541.1	681.2	680.0	676.9
Iowa	683.9	623.8	558.8	505.2
Kansas	1024.2	949.4	975.7	619.3
Kentucky	527.2	638.5	554.0	1081.8
Louisiana	1207.0	1721.6	1853.4	1903.3
Maine	981.0	1047.5	895.4	921.4
Maryland	1082.9	1296.3	1195.0	1286.0
Massachusetts	2482.5	2061.6	1647.3	1497.8
Michigan	899.5	1007.7	1165.2	1013.7
Minnesota	445.7	415.3	463.0	412.5
Mississippi	2930.6	3386.2	3840.3	3600.4
Missouri	1762.2	1740.5	1675.8	1627.1
Montana	505.6	680.4	910.2	917.9
Nebraska	631.8	687.8	665.3	696.2
Nevada	513.8	761.8	832.8	859.0
New Hampshire	106.9	1059.1	1181.4	1151.0
New Jersey	1463.2	1609.9	1455.9	1288.3
New Mexico	943.8	1001.9	1023.6	783.2
New York	1007.8	1171.6	1325.8	1190.1
North Carolina	754.6	831.0	901.6	997.7
North Dakota	490.0	484.4	523.0	436.6
Ohio	706.3	742.3	771.4	726.9
Oklahoma	686.6	765.7	783.9	714.9
Oregon	766.2	869.0	1015.6	857.5
Pennsylvania	1651.7	2052.8	2389.9	2173.9
Rhode Island	1939.1	1821.8	1571.9	1608.9
South Carolina	1116.7	1416.7	1483.7	1310.7
South Dakota	307.1	297.1	453.0	352.0
Tennessee	1910.6	2270.8	2855.0	3140.3
Texas	1239.8	1372.1	1409.2	1265.1
Utah	677.6	999.7	1327.9	1423.6
Vermont	1694.6	1579.8	1724.5	1720.2
Virginia	575.8	823.8	1050.5	1221.1
Washington	847.2	790.9	890.5	846.6
West Virginia	801.1	892.0	934.4	821.7
Wisconsin	794.2	895.6	1012.7	866.1
Wyoming	1204.6	1207.1	1150.9	726.4

TABLE 14

REGRESSION ANALYSIS OF IMPACT OF DENIALS ON UTILIZATION

Coeficients for Denial Measures
(p-values in parethesis)

Type of Provider	Model A		Model B		Model C			
					current		lagged	
	D_t		D_{t-1}		D_t		D_{t-1}	
Inpatient								
Levels Model	-.016	(.86)	-.061	(.63)	-.105	(.49)	.135	(.70)
% Change Model	-.013	(.96)	-.033	(.91)	.093	(.79)	-.639	(.42)
SNF								
Levels Model	-.002	(.02)	-.003	(.01)	-.002	(.47)	-.001	(.89)
% Change Model	-.352	(.01)	-.257	(.04)	.031	(.94)	-.758	(.29)
HHA								
Levels Model	1.019	(.45)	2.04	(.23)	-4.84	(.19)	7.05	(.05)
% Change Model	.545	(.53)	.690	(.42)	-.304	(.02)	4.23	(.00)

5.0 CONCLUSIONS

The key finding regarding PROs and FIs is the considerable variability in their activities and performance across the country. PROs vary widely in their ability to detect problems in medical records, as well as in their rates of denials of hospital services. FIs vary widely as to their denial rates as well. Only the FI evaluations (CPEP) show minimal variability, and it is not clear whether this is due to the inability of the evaluation instrument to discriminate among FIs, or whether FIs are truly homogeneous in their operations.

The variability in denial activity lead us to question the potential impact of denial activity on utilization, which also varies considerably nationwide. Using regression analysis to assess the impact of denial activity on interstate differences in utilization, we found no significant relationship for inpatient utilization, and suspect that the many things contributing to differences in utilization overwhelmed any contribution denial activity may have made to these differences. For HHAs, data and measurement issues were not ideal and regression results mixed and uncertain. For SNFs, we found that denial activity had a small but significant impact on interstate variation in utilization, for denials in the current period and in the prior period, but not for the third regression model which included both current and lagged denial rates. Because measurement problems exist for SNFs as well, we interpret these findings very cautiously.

In general, data and measurement problems handicapped our ability to assess the impact of denial activity on utilization, particularly for HHA and SNF utilization. Improved data, such as denials of HHA visits (not claims) and SNF admissions, rather than of claims, would improve our confidence in any findings.

HMO ENROLLMENT

AGGREGATE DEMAND

MEDICAID IMPACTS

MEDICAID PHC USE

CROSSOVER USE AND SPENDING

APPENDIX A

REGRESSION MODEL RESULTS

INPATIENT MODEL

HMO ENROLLMENT

AGGREGATE DEMAND

MEDICAID IMPACTS

MEDICAID PHC USE

CROSSOVER USE AND SPENDING

Model A: D_t

$$\text{Inpatient Admissions}_{84,85} = f(\text{Year 85}, \text{Inpatient Admissions}_{83}, \text{Denial Rate}_{84,85}, \text{SuperPRO Rate}_{85}) + E$$

$R^2 = .10$
$F = 3.12$
$n = 87$

	Coefficient	P-Value
Intercept	0.057	.0014
Year 85*	-0.033	.0001
Inpatient Denial Rate$_{84,85}$	-0.016	.8639
Inpatient Admissions$_{83}$	0.794	.0001
SuperPRO Rate	0.001	.3221

*Year 85: 1=1985 0=1984

Model A: D_t

$$\frac{\text{Inpatient Admissions}_{85} - \text{Inpatient Admissions}_{84}}{\text{Inpatient Admissions}_{84}} = f(\text{Year 85}, \text{Denial Rate}_{84,85}, \text{SuperPRO Rate}_{85}) + E$$

$R^2 = .85$
$F = 114.19$
$n = 87$

	Coefficient	P-Value
Intercept	-.023	.2465
Year 85*	-.033	.0033
Inpatient Denial Rate$_{84,85}$	-.013	.9565
SuperPRO Rate	-.001	.7040

*Year 85: 1=1985 0=1984

Model B: D_{t-1}

Inpatient Admissions$_{85,86}$ = f(Year 86, Denial Rate$_{84,85}$, Inpatient Admissions$_{83}$, SuperPRO Rate$_{85}$) + E

R^2 = .69
F = 45.02
n = 87

	Coefficient	P-Value
Intercept	0.072	.0023
Year 86*	-0.019	.0026
Inpatient Denial Rate$_{84,85}$	-0.061	.6332
Inpatient Admissions$_{83}$	0.688	.0001
SuperPRO Rate	0.003	.7338

*Year 86: 1= 1986 0 = 1985

Model B: D_{t-1}

$$\frac{\text{Inpatient Admissions}_{86} - \text{Inpatient Admissions}_{85}}{\text{Inpatient Admissions}_{85}} = f(\text{Year 86, Denial Rate}_{84,85}, \text{SuperPRO Rate}_{85}) + E$$

$R^2 = .07$
$F = 2.00$
$n = 87$

	Coefficient	P-Value
Intercept	-0.040	.1149
Year 86*	0.031	.0279
Inpatient Denial Rate$_{84,85}$	-0.033	.9092
SuperPRO Rate	-0.002	.3213

*Year 86: 1=1986 0=1985

Model C: D_t, D_{t-1}

Inpatient Admissions$_{85}$ = f(Denial Rate$_{85}$, Denial Rate$_{84}$, Inpatient Admissions$_{83}$, SuperPRO Rate$_{85}$) + E

R^2 = .74
F = 27.15
n = 43

	Coefficient	P-Value
Intercept	0.067	.0270
Inpatient Denial Rate$_{85}$	-0.105	.4898
Inpatient Denial Rate$_{84}$	0.135	.6951
Inpatient Admissions$_{83}$	0.687	.0001
SuperPRO Rate	0.001	.5721

Model C: D_t, D_{t-1}

$$\frac{\text{Inpatient Admissions}_{86} - \text{Inpatient Admissions}_{85}}{\text{Inpatient Admissions}_{84}} = f(\text{Denial Rate}_{85}\ \text{Denial Rate}_{84},\ \text{SuperPRO Rate}_{85}) + E$$

$R^2 = .03$
$F = .47$
$n = 43$

	Coefficient	P-Value
Intercept	-0.026	.4523
Year 86*	0.925	.7938
Inpatient Denial $\text{Rate}_{84,85}$	-0.639	.4245
SuperPRO Rate	-0.003	.3695

SNF MODEL

Model A: D_t

$$\text{SNF Admissions}_{84,85} = f(\text{Year 85}, \text{Denial Rate}_{84,85}, \text{SNF Admissions}_{83}) + E$$

$R^2 = .68$
$F = 64.48$
$n = 93$

	Coefficient	P-Value
Intercept	0.003	.0008
Year 85*	0.001	.0220
SNF Denial Rate$_{84,85}$	-0.002	.0172
SNF Admissions$_{83}$	0.877	.0001

*Year 85: 1=1985 0=1984

Model A: D_t

$$\frac{\text{SNF Admissions}_{85} - \text{SNF Admissions}_{84}}{\text{SNF Admissions}_{84}} = f(\text{Year 85, Denial Rate}_{84,85},) + E$$

$R^2 = .09$
$F = 4.31$
$n = 93$

	Coefficient	P-Value
Intercept	0.291	.0002
Year 85*	0.089	.3454
SNF Denial $\text{Rate}_{84,85}$	-0.352	.0060

*Year 85: 1=1985 0=1984

Model B: D_{t-1}

SNF
Admissions$_{85,86}$ = f(Year 86, Denial Rate$_{84,85}$, SNF Admissions$_{83}$,) + E

R^2 = .38
F = 18.58
n = 93

	Coefficient	P-Value
Intercept	0.006	.0001
Year 86*	0.000	.9432
SNF Denial Rate$_{84,85}$	-0.003	.0062
SNF Admissions$_{83}$	0.681	.0001

*Year 86: 1=1986 0=1985

Model B: D_{t-1}

$$\frac{\text{SNF Admissions}_{86} - \text{SNF Admissions}_{85}}{\text{SNF Admissions}_{85}} = f(\text{Year 86, Denial Rate}_{84,85}) + E$$

$R^2 = .12$
$F = 5.93$
$n = 93$

	Coefficient	P-Value
Intercept	0.342	.0001
Year 86*	-0.235	.0104
SNF Denial $Rate_{84,85}$	-0.257	.0358

*Year 86: 1=1986 0=1985

Model C: D_t, D_{t-1}

$$\text{SNF Admissions}_{85} = f\ (\text{Denial Rate}_{85}, \text{Denial Rate}_{84}, \text{SNF Admissions}_{83}) + E$$

$R^2 = .49$
$F = 13.57$
$n = 46$

	Coefficient	P-Value
Intercept	0.005	.0004
Inpatient Denial Rate$_{85}$	-0.002	.4736
Inpatient Denial Rate$_{84}$	-0.001	.8927
SuperPRO Rate	0.765	.0001

Model C: D_t, D_{t-1}

$$\frac{\text{SNF Admissions}_{85} - \text{SNF Admissions}_{84}}{\text{SNF Admissions}_{84}} = f(\text{Denial Rate}_{85}, \text{Denial Rate}_{84}) + E$$

$R^2 = .09$
$F = 2.31$
$n = 46$

	Coefficient	P-Value
Intercept	0.471	.0010
SNF Denial $Rate_{85}$	0.031	.9362
SNF Denial $Rate_{84}$	-0.758	.2778

HMO ENROLLMENT

AGGREGATE DEMAND

MEDICAID IMPACTS

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CROSSOVER USE AND SPENDING

HHA MODEL

HMO ENROLLMENT

AGGREGATE DEMAND

MEDICAID IMPACTS

MEDICAID PHC USE

CROSSOVER USE AND SPENDING

Model A: D_t

$$\text{HHA Visits}_{84,85} = f(\text{Year 85}, \text{Denial Rate}_{84,85}, \text{HHA Visits}_{83}) + E$$

$R^2 = .85$
$F = 154.59$
$n = 87$

	Coefficient	P-Value
Intercept	-0.012	.8732
Year 85*	0.074	.1806
HHA Denial $\text{Rate}_{84,85}$	0.020	.4481
HHA Visits_{83}	1.138	.0001

*Year 85: 1=1985 0=1984

Model A: D_t

$$\frac{\text{HHA Visits}_{85} - \text{HHA Visits}_{84}}{\text{HHA Visits}_{84}} = f(\text{Year 85, Denial Rate}_{84,85},) + E$$

$R^2 = .06$
$F = 2.68$
$n = 93$

	Coefficient	P-Value
Intercept	0.159	.0001
Year 85*	0.084	.0236
HHA Denial $Rate_{84,85}$	0.545	.5271

*Year 85: 1=1985 0=1984

Model B: D_{t-1}

$\text{HHA Visits}_{85,86} = f(\text{Year 86}, \text{Denial Rate}_{84,85}, \text{HHA Visits}_{83},) + E$

$R^2 = .77$
$F = 95.06$
$n = 87$

	Coefficient	P-Value
Intercept	0.063	.4970
Year 86*	-0.090	.1947
$\text{HHA Denial Rate}_{84,85}$	2.040	.2291
HHA Visits_{83}	1.127	.0001

*Year 86: 1=1986 0=1985

Model B: D_{t-1}

$$\frac{\text{HHA Visits}_{86} - \text{HHA Visits}_{85}}{\text{HHA Visits}_{85}} = f(\text{Year}_{86}, \text{Denial Rate}_{84,85}) + E$$

$R^2 = .12$
$F = 6.2$
$n = 93$

	Coefficient	P-Value
Intercept	0.077	.0092
Year 86*	-0.127	.0007
HHA Denial $\text{Rate}_{84,85}$	0.690	.4178

Year 86: 1=1986 0=1985

Model C: D_t, D_{t-1}

$$\text{HHA Visits}_{85} = f(\text{Denial Rate}_{85}, \text{Denial Rate}_{84}, \text{HHA Visits}_{83}) + E$$

$R^2 = .82$
$F = 62.60$
$n = 43$

	Coefficient	P-Value
Intercept	0.054	.6452
HHA Denial Rate$_{85}$	-4.842	.1945
HHA Denial Rate$_{84}$	7.050	.0537
HHA Visits$_{83}$	1.161	.0001

Model C: D_t, D_{t-1}

$$\frac{\text{HHA Visits}_{85} - \text{HHA Visits}_{84}}{\text{HHA Visits}_{84}} = f(\text{Denial Rate}_{85}, \text{Denial Rate}_{84}) + E$$

$R^2 = .18$
$F = 4.85$
$n = 46$

	Coefficient	P-Value
Intercept	0.092	.0017
HHA Denial $Rate_{85}$	-3.041	.0197
HHA Denial $Rate_{84}$	4.226	.0033

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Impacts of the Medicare Prospective Payment System on State Medicaid Programs

WORKING PAPER

Mary Gabay
Stephen H. Bell
Abt Associates Inc.

September 13, 1988

AN EQUAL OPPORTUNITY EMPLOYER

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Abstract

This paper analyzes the impacts of Medicare's Prospective Payment System (PPS) on state Medicaid programs. Those impacts arise from two sources: Medicare's influence on the types of new reimbursement systems adopted by state Medicaid agencies, and the effects of Medicare payment changes on utilization patterns and payment outcomes under Medicaid.

Looking at the series of Medicaid program innovations undertaken in the 1980s, we find that Medicare's PPS had a substantial impact on Medicaid program design in the post-PPS period (1984-1987). In particular, the Medicare PPS seems to have inspired the currently dominant trend of adopting DRG-based systems of inpatient hospital reimbursement. Since the implementation of PPS in 1983, 13 states have moved to DRG-based reimbursement, and several additional states are planning to do so in the near future. In 1987, DRG-based systems covered 31 percent of total Medicaid general hospital inpatient recipients and paid for 27 percent of inpatient costs. In contrast, the growth in the number of states using other types of prospective systems ended in 1983, while reliance on retrospective cost-based reimbursement continues to decline.

A similar time-trend analysis of Medicaid program such as total expenditures per recipient and total hospital expenditures per recipient outcomes was also conducted using HCFA Form 2082 Medicaid data. Here, we found clear evidence of a decrease in the rate of growth of total Medicaid expenditures per recipient beginning in 1984. Downward breaks in trend are also evident for both aged and non-aged inpatient hospital expenditures per recipient, which suggests that the overall reduction in spending was achieved in large part by the more judicious use of inpatient hospital care. It is interesting to note that this reduction occurred for both aged and non-aged Medicaid recipients, with outpatient hospital care for the non-aged and home health care for both groups taking up some of the slack. Nursing home care does not appear to have experienced any accelerated growth due to PPS, a finding that may be explained as a result of the tight supply of nursing home beds in most states over the study period.

In a final section of the paper, we analyze Medicaid program outcomes separately for the different types of state reimbursement systems.

Here, we find that both non-DRG-based prospective systems and DRG-based prospective systems have substantially reduced the growth of inpatient hospital expenditures per recipient relative to cost-based retrospective systems. Limited evidence from the 1984 to 1986 period suggests that this has been accomplished in the case of the DRG systems by reducing the number of covered inpatient days and, in the case of the non-DRG systems, by reducing per diem payments. Somewhat surprisingly, the relative success of the DRG states in limiting the growth of inpatient hospital services extends to other types of services; evidently, less money spent on inpatient hospital care does not mean higher expenditures for other services. As a result, we find that both non-DRG and, especially, DRG prospective reimbursement systems have considerably outperformed traditional cost-based reimbursement systems in limiting the growth of overall Medicaid spending per recipient.

Impacts of the Medicare Prospective Payment System on State Medicaid Programs

INTRODUCTION

The Medicare Prospective Payment System (PPS) was enacted into law in April of 1983 and began implementation in October of the same year. In the enacting legislation, Congress required that annual reports evaluating the effects of the new system be prepared by the Health Care Financing Administration (HCFA). Among the issues to be covered in these reports is the impact of PPS on other third-party payers, including commercial insurers and Medicaid. This paper explores PPS impacts on state Medicaid programs.

1.1 Medicare and the Prospective Payment System

Congress enacted the Medicare program in 1965 in response to the growing number of elderly Americans who, while subject to high medical care costs, were living without health insurance because of retirement. The program consists of two distinct insurance systems: Part A Hospital Insurance which covers almost the entire elderly population and Part B Supplemental Medical Insurance which pays for physician services, other health care services, and medical supplies for those elderly who choose to enroll and pay a monthly premium. The primary goals of the program are to increase the elderly's access to health care services and reduce the financial burden of their high health care costs.

Today, Medicare covers not only the elderly but also the eligible disabled and persons with end-stage renal disease. Table 1.1 shows Medicare expenditures in 1985 as a proportion of total personal health expenditures, by service type. Medicare is the largest single payer of hospital care and physician services in the United States, paying almost 30 percent of the nation's hospital expenses in 1985 and over 20 percent of physician care expenditures. Nursing home care, however, has not generally been covered by Medicare: less than 2 percent of the nation's nursing home care was paid for by Medicare in 1985. Overall, Medicare covered 19 percent of the nation's total personal health care expenditures, or roughly $70 billion worth of services.

Table 1.1

National Health Expenditures: Total Personal and Medicare, 1985

Type of Service	Total Personal Health Expenditures (Billions of $)	Total Medicare Expenditures (Billions of $)	Medicare Expenditures as a Percent of Total
Hospital Care	167.2	48.9	29.2
Physician Services	82.8	16.9	20.5
Nursing Home Care	35.0	.6	1.7
Other Personal Health Care Expenditures	86.4	4.1	4.8
Total	371.3	70.5	19.0

Source: National Health Expenditures, 1986-2000. Health Care Financing Review. Vol. 8, No. 4, Tables 15-19.

Escalating costs have plagued the Medicare program throughout the seventies and early eighties. From 1967, the first full year of program operations, through 1982, total Medicare benefit payments grew at an annual compounded rate of 18.3 percent. After adjusting for inflation (using the Consumer Price Index), the real rate of growth for the period was 10.0 percent. These expenditure increases were not so much attributable to increases in utilization (cost-sharing--a deductible for Part A and monthly premiums for Part B--places some restraint on utilization) as to increases in the cost of health care services. Legislation aimed at controlling escalating costs was passed in 1982 and in 1983.

In 1982, the Tax Equity and Fiscal Responsibility Act (TEFRA) set limits on Medicare reimbursements for hospital costs. The legislation established a hospital-specific target amount per discharge in its base year and an overall limit on reimbursement for each hospital. The legislation also required that the Secretary of the Department of Health and Human Services recommend a prospective reimbursement system for Medicare hospital payments.

The Prospective Payment System was implemented in October of 1983 in forty-six states and the District of Columbia. Four states--New York, New Jersey, Maryland, and Massachusetts--were operating under HCFA waivers of Medicare regulations at the time, administering all-payer prospective systems. (New Jersey and Maryland continue to operate under Medicare waivers.) The new reimbursement methodology assigns a prospectively determined rate to each hospital patient according to his or her age, sex, and diagnosis-related group (DRG). While rates were originally a blend of hospital-specific, regional, and national rates, the end of the four-year phase-in has brought most hospitals to uniform national rates. The DRG rates cover only hospital operating costs; payments for capital costs and direct medical education are passed through to be paid on a retrospective cost basis. Cost and length-of-stay outliers are reimbursed on a modified cost basis. Excluded from the system are psychiatric, rehabilitation, children's, and long-term care hospitals. Psychiatric and rehabilitation units of short-term general hospitals are excluded as well.

PPS has fundamentally changed the way Medicare reimburses hospitals for inpatient stays. Given the size of Medicare as a purchaser of inpatient hospital stays and the completeness of the change in the reimbursement system

created by the switch to prospective payment, it was inevitable that the impact of the change would be felt outside the Medicare program, by Medicaid and other third-party payers.

1.2 The Medicaid System

Medicaid, implemented at the same time as Medicare, was created to provide access to health care for low-income adults and children. Medicaid is a little over half the size of the Medicare program in terms of total dollars expended. Table 1.2 compares total personal health expenditures to Medicaid expenditures for 1985. As can be seen, Medicaid's two largest expenditure categories are hospital care and nursing home care. Over 40 percent of the nation's nursing home expenditures are paid for by Medicaid. And while the $14.9 billion Medicaid spent on hospital care in 1985 made hospital care Medicaid's largest expenditure category, Medicaid covered less than 9 percent of total national hospital care expenditures (compared to over 29 percent covered by Medicare). Overall, Medicaid accounts for slightly more than 10 percent of the nation's personal health care expenditures.

Medicaid is a state-administered program whose funding responsibilities are shared by the state and federal governments. Federal authorities have mandated minimum eligibility and service requirements which the states must meet in order to receive federal matching funds. Eligibility must be extended to persons who receive cash payments from either Aid to Families with Dependent Children (AFDC) or, in most cases, the Supplemental Security Income (SSI) program. (SSI recipients became Medicaid eligible in 1972.) These individuals are known as the categorically eligible. States may also extend coverage, at their option, to other groups known as (1) the optionally categorically needy, people who are eligible for AFDC but for one reason or another are not receiving cash payments; and (2) the medically needy, individuals with large medical bills whose income is above the AFDC payment standard but below 133 1/3 percent of that standard. Under the spend-down provision, individuals and families (including middle-class elderly with large medical bills, usually from nursing homes) can be determined medically needy and eligible for Medicaid if their income is above the 133 1/3 percent standard but high medical expenses cause their net income to fall below the medically needy maximum.

Table 1.2

National Health Expenditures: Total Personal and Medicaid, 1985

Type of Service	Total Personal Health Expenditures (Billions of $)	Total Medicaid Expenditures (Billions of $)	Medicaid Expenditures as a Percent of Total
Hospital Care	167.2	14.9	8.9
Physician Services	82.8	3.5	4.3
Nursing Home Care	35.0	14.8	42.4
Other Personal Health Care Expenditures	86.4	6.8	7.9
Total	371.3	40.1	10.8

Source: National Health Expenditures, 1986-2000. Health Care Financing Review. Vol. 8, No. 4, Tables 15-19

Mandated services under Medicaid include physician, inpatient hospital, outpatient hospital, rural health clinic, other lab and x-ray, skilled nursing facility for those 21 years of age and over, early and periodic screening, diagnosis and treatment, family planning, and nurse-midwife services. States receive federal matching funds (rates ranged from 50.00 percent to 78.42 percent in 1986) for these basic services as well as for other services approved for inclusion by Congress and offered at the state's option.

As with Medicare, Medicaid costs rose swiftly during the seventies and early eighties. States tried to contain costs in this period by tightening eligibility requirements and through utilization controls. And, although the number of recipients decreased, cost per recipient continued to rise. Again, soaring health care costs, rather than increasing volume, were responsible for the program's rapidly rising expenditures. While state Medicaid agencies could apply for waivers to administer special demonstrations of alternative reimbursement systems which would give providers incentives to hold down costs, obtaining waivers was reportedly difficult and few states chose to use them. (Prior to 1981, only nine states had used Medicaid waivers.)

As expenditures continued to increase, Congress enacted several pieces of legislation aimed at reforming Medicaid's hospital reimbursement systems. The 1981 Omnibus Budget Reconciliation Act (OBRA) removed the requirement that Medicaid hospital reimbursement follow Medicare reasonable cost principles, granting states new flexibility in the provider reimbursement policies they chose to follow. It also encouraged states to control their Medicaid spending by reducing the federal matching percentage, increasing the cost to the states of the Medicaid program. The 1982 changes in Medicare hospital reimbursement under TEFRA described above are binding on Medicaid programs as well. Finally, enactment of PPS replaced TEFRA for the Medicare program, and while the PPS legislation did not alter state Medicaid programs, it has inevitably influenced the types of innovations adopted by the states.

1.3 Overview of the Report

The impact of Medicare's PPS on state Medicaid programs can be divided into two categories. The first category consists of those impacts

that arise from Medicare's influence on the type of reimbursement system innovations adopted by state Medicaid agencies. Chapter 2 examines these impacts. It analyzes the trends in implementation of alternative reimbursement systems in the post-OBRA period (1981-1987), with special attention given to implementation of DRG-based systems since the advent of PPS in 1983. Implementation trends are analyzed from three perspectives: the number of states under each system, the percent of total Medicaid general hospital inpatient recipients in states choosing different systems, and the percent of total Medicaid general hospital inpatient expenditures in states choosing different systems.

Chapter 3 examines a second category of PPS impacts--impacts on Medicaid program outcomes. The analysis here uses national data for the years 1980-1987 to examine trends in such Medicaid program outcomes as the number of recipients and expenditures for inpatient hospital care, nursing home care, hospital outpatient services, and home health care. While examination of these trends will not provide us with direct evidence of a PPS-Medicaid program link, they can supply us with indirect evidence of PPS effects.

The final chapter, Chapter 4, analyzes impacts on program outcomes in states with different program reimbursement policies, such as retrospective, prospective, and DRG-based systems. Program outcomes for the different types of states are examined to detect changes in trends as states switched from retrospective to DRG or other prospective payment systems.

IMPACTS ON MEDICAID PROGRAM DESIGN

Prior to the 1981 Omnibus Budget Reconciliation Act (OBRA), state Medicaid program reimbursement methodologies were tied (by the enacting legislation) to Medicare cost reimbursement principles. States seeking to implement any alternative reimbursement system had to apply for waivers from HCFA. OBRA granted states greater authority to design and implement their own reimbursement policies. In contrast, the 1983 legislation which implemented the Medicare Prospective Payment System did not alter Medicaid programs. Still, Medicare's PPS legitimized rate setting by a public payer, and may have provided states with the impetus to adopt their own prospective systems. We therefore examine the use of prospective (and other) payment systems in this chapter.

2.1 The Overall Trend in Hospital Reimbursement Methods

Exhibit 2.1 shows the decomposition of Medicaid hospital reimbursement systems, by state and type, for the years 1980-1987.[1] As can be seen, in 1980 only seven states were operating prospective reimbursement systems under Medicaid waivers. By 1987, however, following seven years of steady growth in the prospective approach, 41 state systems were prospective in nature. The largest single-year jump occurred in 1983, the year Medicare's PPS was implemented.

The classification of state reimbursement systems used in Exhibit 2.1 is based on several secondary sources.[2] While these sources were not always in agreement on how to classify every system, we have attempted to carefully consider the details of each system and place them in the appropriate category. Systems classified as prospective set payment rates in advance of service provision and do not reconcile total payments to total costs at year's end. Partial reconciliation may occur in states categorized as prospective. However, when reconciliation includes both the return of

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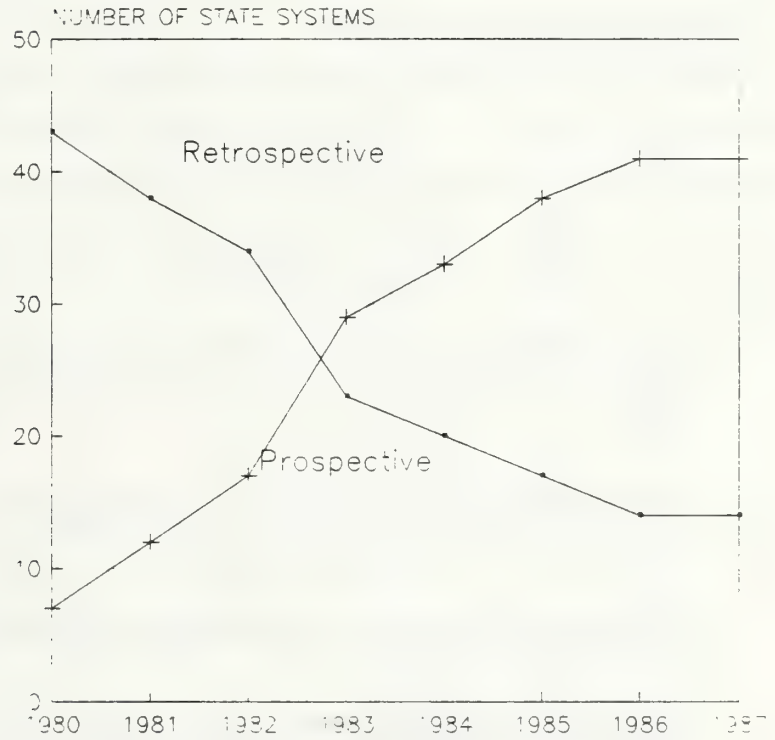
[1] A table listing the states within each category for each year is included in Appendix A.

[2] Korda, 1985; Singer, et al., 1986; Laudicina, 1985; Lipson and Fisher, 1986; and Lipson, Fisher, and Thomas, 1987.

Exhibit 2.1
TRENDS IN STATE HOSPITAL PAYMENT SYSTEMS
Retrospective vs Prospective



overpayments to the state and additional reimbursement to underpaid hospitals, the state system is considered retrospective even if rates are set in advance. Complicated rate calculation procedures and various rate adjustment and reconciliation strategies can lead to a blurring of the line between retrospective and prospective systems. Hopefully, attention to system detail has resulted in a minimum of misclassifications. Also, a few states operate two reimbursement systems concurrently--usually one reimburses urban hospitals, and a second rural hospitals. We classify these components separately; hence, the number of state systems is greater than fifty.

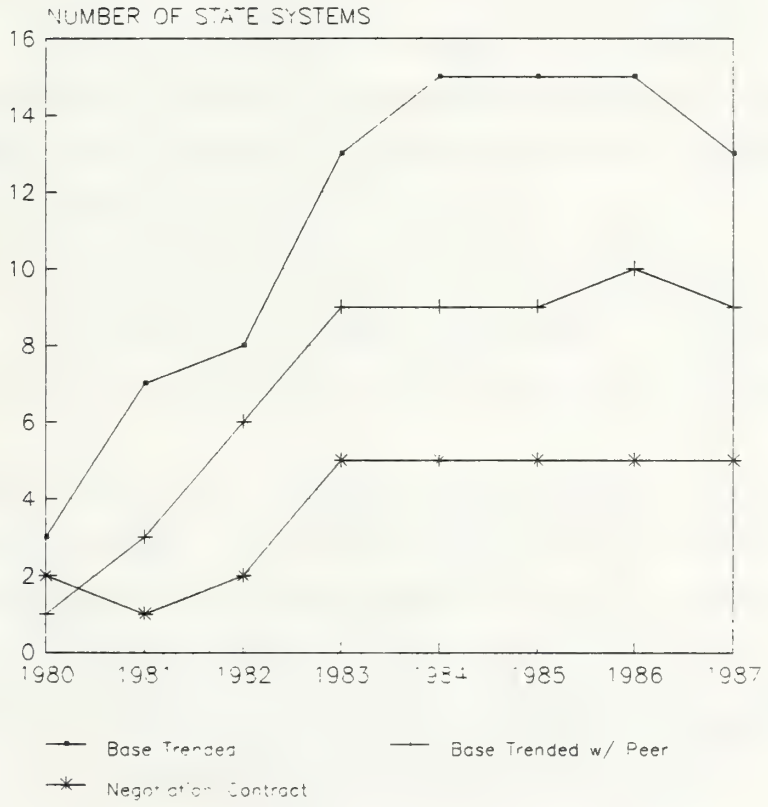
2.2 Non-DRG Prospective Systems

Given the flexibility to adopt alternative hospital reimbursement systems offered by OBRA, the states implemented a variety of new prospective payment systems in the eighties. We have grouped these new systems into four categories using a classification scheme adopted by Korda (1985) in her study of innovations in Medicaid hospital reimbursement. The classifications are:

- Base-trended--trend or inflation factors used to calculate a prospective rate from base year costs and paid on a per diem or per admission/discharge basis;
- Base-trended with peer--peer groupings used in addition to trend factors as another limit or ceiling on base year projections;
- DRG-based--DRGs used to establish a per-case payment rate; and
- Negotiation/contracts--negotiations and/or contracting with hospitals used to set payment rates.

Trends in three of these system types are shown in Exhibit 2.2; DRG-based systems are discussed in the next section. None of the three types of systems in the exhibit--base trended, base-trended with peer, and negotiation/contracts--were used very often prior to the 1981 OBRA legislation. Only six states used such reimbursement systems in 1980. In 1982, the year after OBRA, 10 more state systems had joined these groups. Base-trended and base-trended with peer systems accounted for 14 of the total of 16 prospective systems in 1982. After TEFRA in 1982, the number of base-

Exhibit 2.2
PROSPECTIVE HOSPITAL PAYMENT SYSTEMS
Except DRG-Based Systems



trended systems (which use TEFRA limits but do not reconcile to cost) increased by 5, the largest one-year increase in any category. Smaller increases were registered that year by the other non-DRG prospective systems. Then, in 1983, Medicare implemented PPS, and the growth in the number of state Medicaid programs choosing non-DRG-based prospective systems essentially ended. Counts of states in each category in 1987 are unchanged from 1983.

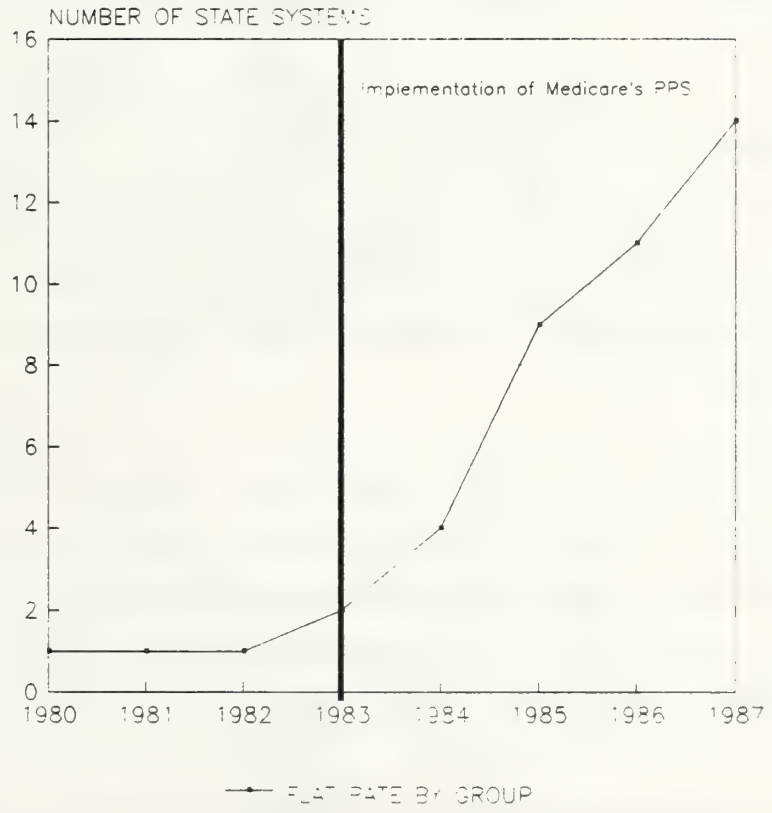
2.3 DRG-Based Systems

The leveling off of state use of the three non-DRG prospective systems was accompanied by a steady increase in the adoption of DRG-based systems. Since 1983 and the implementation of PPS, the Medicare movement to DRG-based systems for Medicaid has been the dominant trend. This trend is illustrated in Exhibit 2.3. Prior to 1983, only one state (New Jersey) used DRGs as a unit of payment for inpatient hospital services. By 1987, 14 states were operating DRG-based systems. Since the last comprehensive analysis of the impact of Medicare's PPS system on Medicaid (Singer, et al., 1986), three additional states have implemented DRG-based reimbursement--Colorado, Iowa, and Montana.

Most state Medicaid DRG systems are a variation on the Medicare theme, combining several of the major features of the Medicare system (such as the 468 DRG classifications) but adding some of their own features as well. Some states, such as Iowa, have adapted the Medicare system to suit their own Medicaid systems. Iowa payment rates follow a 50-50 split between hospital-specific and statewide rates, while Medicare uses uniform rates nationwide. Unlike Medicare, adjustments are made in Iowa for length-of-stay inliers (short stays), as well as for length-of-stay outliers. Rates include add-ons for capital costs, medical education, and disproportionate shares rather than dealing with these costs as pass-throughs as in the Medicare system. And like PPS, the Iowa system excludes rehabilitation units. Unlike PPS, however, substance abuse and psychiatric units fall within the system's domain.

Several other states are currently exploring DRG-based systems or are planning to implement such systems in the near future. These include

Exhibit 2.3
DRG–BASED PROSPECTIVE SYSTEMS FOR
MEDICAID INPATIENT HOSPITAL SERVICES



North Dakota, Connecticut, Indiana, Kansas, New York, Tennessee, Wisconsin, and Wyoming.

Table 2.1 presents a catalogue of state Medicaid inpatient hospital reimbursement systems with prospective payment as of August 1987. For each system type, the table lists states according to their units of payment (e.g., per diem or per DRG) and rate-setting methodologies (e.g., government-set provider-specific or negotiated provider-specific). For detailed descriptions of all state Medicaid reimbursement systems, see Singer, et al., 1986. Descriptions of recent changes can be found in the "Major Changes in State Medicaid and Indigent Care Programs" series compiled by the Intergovernmental Health Policy Project.

2.4 The Decline of Retrospective Systems

Needless to say, the steady rise in prospective systems of provider reimbursement was accompanied by an equally steady decline in retrospective cost-based systems. Exhibit 2.4 shows the trend in the use of retrospective payment systems. Retrospective systems have been classified into three types, discussed in turn below.

Cost retrospective systems adhere to the old Medicare cost principles of reimbursement. (Since 1982, these systems have also included the TEFRA limits.) In 1980, 40 states used this type of system. Every year since then the number of cost-based systems has declined. (In 1987, one cost system, Montana, became a DRG-based system but Utah removed rural hospitals from their DRG-based system and began paying them on a cost basis, so the number of cost-based systems remained the same.)

The two other retrospective system types--cost-to-trend and cost-to-trend and peer--adopt additional standards other than the TEFRA limits in establishing reimbursement rates. Cost-to-trend systems include a variety of additional adjustments for volume, occupancy, Medicaid admissions, or case mix. Cost-to-trend and peer systems use methods similar to cost-to-trend systems, but also include peer group standards. Neither of these system types has been used widely and their trend lines have remained relatively flat.

Table 2.1

Catalogue of State Medicaid Systems
With Prospective Payment
(as of August 1987)

System Type	Unit of Payment	Rate Setting Methodology			
		Provider-Specific			Peer Group Based
		Government Set	Negotiated	Competitively Bid	Government Set
Base Trended	Budget System	Alaska Massachusetts Maine			
	Per Admission/ Discharge	Georgia Maryland			
	Per Diem	Arkansas Florida Kansas Missouri Nebraska[1] North Carolina Oklahoma Tennessee			
Base Trended with Peer	Per Admission/ Discharge				Nevada[2] New Mexico[3]
	Per Diem				Alabama Hawaii Kentucky Mississippi New York Virginia
Flat Rate by Group	Per DRG	Colorado Iowa Michigan Minnesota Montana* South Dakota Washington			New Jersey Ohio Oregon Pennsylvania South Carolina Texas Utah[4]
Negotiation/ Contract	Per Capita			Arizona	
	Budget System		Rhode Island		
	Per Diem		California[5] Illinois[6] Vermont		

* Implemented in 10/87.

[1] Nebraska now allows negotiation of a written contractual agreement for a per diem rate as an alternative to the government-set per diem rate.

[2] Nevada's unit of payment is per admission for stays of 1-15 days and per diem for days over 15.

[3] Only hospitals with more than 150 Medicaid discharges per year are reimbursed the prospective rate. Hospitals with less than 150 discharges are paid on a TEFRA-type retrospective system.

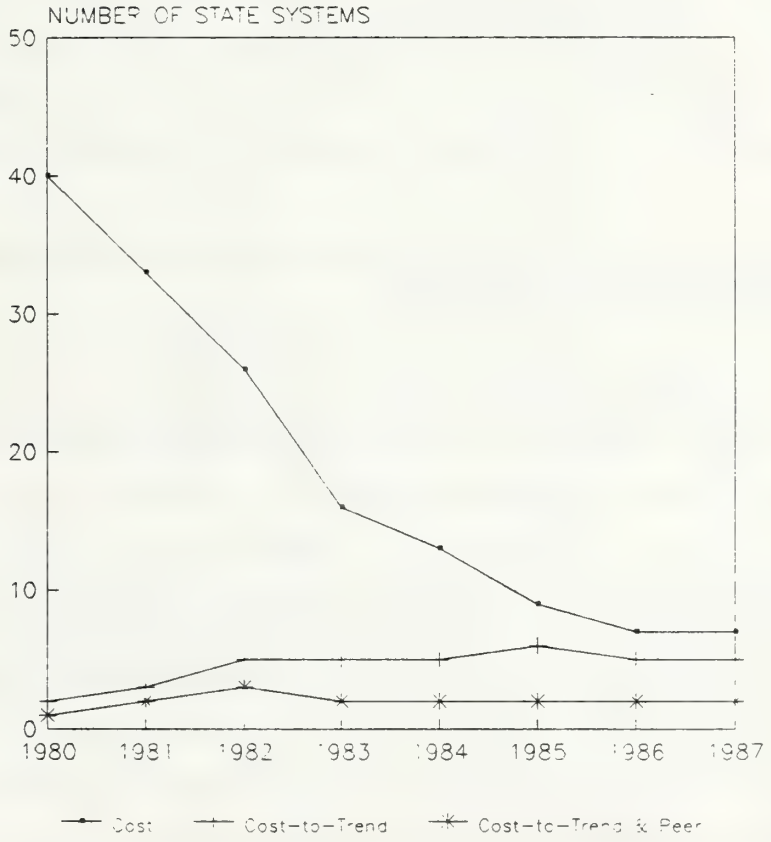
[4] Utah has removed rural hospitals from their DRG system.

[5] California's prospective contracting system applies to urban hospitals only; California law now permits peer grouping of contracting hospitals.

[6] Illinois' contracting system covers 90 percent of state Medicaid days; hospitals not covered by contracting have a base-trended-with-peer prospective system.

Source: Korda (1985), Singer, et al. (1986), Lipson and Fisher (1986) and Lipson, Fisher, and Thomas (1987).

Exhibit 2.4
COST-BASED REIMBURSEMENT SYSTEMS



Characteristics of the six states which in 1987 exclusively used the Medicare cost reimbursement system for inpatient hospital payments are presented in Table 2.2. As can be seen in the table, four of the six states that still operate cost reimbursement systems are quite small, with general hospital inpatient expenditures under $25 million and less than 9,000 general hospital inpatient recipients. The two other states, Indiana and West Virginia, while large relative to the four smaller states, also have recipient and expenditure figures well below the national average. These two states were also the only two of the six states that rely on federal funding for 60 percent or more of their program costs (the national average). This runs counter to the expectation that states with large federal shares--i.e., with little of their own money at stake--would be the most likely to continue under the discredited retrospective cost-based reimbursement approach.

2.5 The Shift in Reimbursement Methods in Relation to Total National Expenditures and Recipients

The shift away from cost-based retrospective systems and toward prospective rate-setting systems can also be seen in the increasing percentage of general hospital inpatient expenditures and recipients which are in states with prospective payment systems. Exhibit 2.5 presents Medicaid inpatient expenditures in states with prospective payment as a percent of inpatient expenditures in all states.[3,4] As can be seen, the percentage of expenditures under prospective systems has increased steadily since 1980. The largest jump occurred in 1983, when twelve new prospective systems were implemented, more than doubling expenditures under prospective systems (from 33 percent of the total to 76 percent). In 1987, 41 prospective systems covered 92 percent of Medicaid inpatient hospital expenditures nationwide.

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[3]Tables presenting the numbers which correspond to the bars in Exhibits 2.5 and 2.6 are included in Appendix A.

[4]The source for these data is Form HCFA-2082. We checked the data for possible errors by calculating year-to-year percent changes in expenditures per recipient and noting any large changes (those over thirty percent). Expenditures for states with large changes in one or more years were verified using Form HCFA-64 data. After verification only two data points, expenditures in Washington, D.C. for 1984 and 1986, were replaced with the HCFA-64 data.

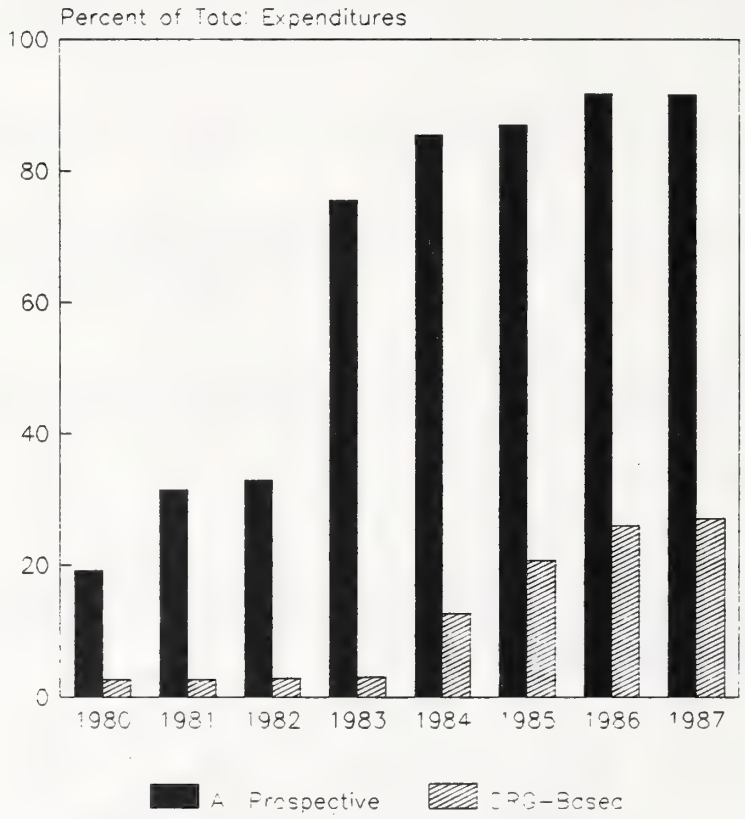
Table 2.2

Characteristics of States Using
Cost Reimbursement for Inpatient Hospital Stays
as of August 1987

State	Inpatient General Hospital Recipients	Inpatient General Hospital Expenditures (Millions $)	Percent Federal Share (FY86)
Delaware	5,791	$22.2	50.00%
Indiana	64,203	192.1	62.82
New Hampshire	5,932	17.0	54.92
North Dakota	8,649	22.4	55.12
West Virgina	37,330	95.5	71.53
Wyoming	5,643	16.5	50.00
Fifty State Average	73,982	224.8	59.22

Source: Recipients and expenditures--HCFA 2082 data; percent federal share--HCFA Office of the Actuary, Analysis of State Medicaid Program Characteristics, 1986.

Exhibit 2.5
GENERAL HOSPITAL INPATIENT EXPENDITURES
IN STATES WITH PROSPECTIVE SYSTEMS



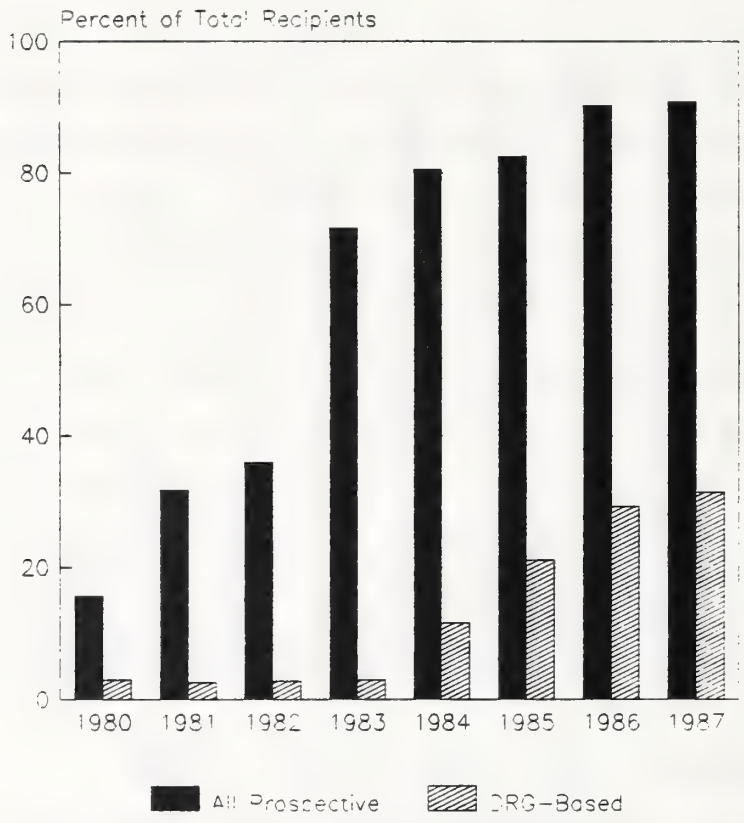
The percentage of expenditures covered by DRG-based systems has also grown rapidly over that period, from 3 percent in 1983 to 27 percent in 1987. The largest percentage increase for DRG-based systems occurred in 1984, the year after PPS implementation, when two very large states--Ohio and Pennsylvania--joined the ranks of DRG-based systems and increased the percentage covered by almost 10 percentage points. Since 1984, the percentage of expenditures covered by all types of prospective systems has increased only 6 percentage points; within this relatively small increase, however, expenditures covered by DRG-based systems has increased more than 14 percentage points.

Exhibit 2.6 presents the percentage of general hospital inpatient recipients covered by prospective systems, and DRG-based systems in particular. It tells much the same story as the earlier graph: only 16 percent of Medicaid recipients were covered by prospective systems in 1980, while 91 percent were covered by 1987. The corresponding numbers for DRG-based systems are three percent in 1980 and 31 percent in 1987. It is interesting to note that the 91 percent of the inpatient hospital recipients covered by systems using prospective payment in 1987 were responsible for 92 percent of the total Medicaid inpatient hospital expenditures. This suggests that costs per recipient did not differ substantially between prospective and retrospective systems. (We explore this issue more thoroughly in Chapter 4.) In contrast, the 31 percent of recipients covered by DRG-based systems were responsible for just 27 percent of total Medicaid inpatient hospital expenditures, suggesting some cost savings in those states.

2.6 Conclusions

It is clear from this analysis that Medicare's PPS has had an impact on Medicaid program design. While OBRA and TEFRA may also have influenced the trends in innovation discussed in this chapter, the Medicare PPS would seem to have inspired the currently dominant trend in new system innovation--the adoption of DRG-based systems. Since the advent of PPS in 1983, 13 states have moved to DRG-based reimbursement and several additional states are planning implementation of such systems in the near future. By 1987, DRG-based systems covered 31 percent of total Medicaid general hospital inpatient recipients and paid 27 percent of inpatient costs. And, while

Exhibit 2.6
GENERAL HOSPITAL INPATIENT RECIPIENTS
IN STATES WITH PROSPECTIVE SYSTEMS



growth in the number of states adopting other types of prospective systems has leveled off, the number adopting DRG-based systems has climbed steadily and will most likely continue to climb into 1988 and beyond.

PROGRAM OUTCOMES--THE NATIONAL PICTURE

Analyzing the impacts of Medicare's PPS on Medicaid program outcomes is a complicated endeavor. Many changes in federal and state legislation and in the health care industry itself have affected the Medicaid program during our study years, 1980-1987. To isolate the effects of PPS will not be easy. Even if we were to attempt a multivariate statistical analysis, we could not control for many of these exogenous influences. Hence, our approach to exploring the impact of PPS on Medicaid program outcomes, outlined below, will reflect a less rigorous but still useful research framework.

In the first section of this chapter, 3.1, we present an overview of the Medicaid program in our study years. This overview includes graphs of trends in Medicaid program expenditures and recipients. Section 3.2 then discusses our hypotheses concerning the possible effects of Medicare's PPS on Medicaid program outcomes and presents graphs that explore these hypotheses by decomposing Medicaid expenditures by type of service and age of recipient. While examination of these graphs will not provide conclusive evidence of PPS impacts on Medicaid program outcomes, they should suggest the basic nature of the PPS-Medicaid link.

3.1 Medicaid Program Statistics, 1980-1987

This section explores three aspects of the national Medicaid picture: the pre-PPS trend in Medicaid program outcomes, any breaks in trend that occurred at the time of PPS implementation, and the post-PPS outcome trend. The analysis centers around several graphs that display trends in Medicaid expenditures and recipients for the total program, for aged recipients only, and for inpatient hospital services only.

The Medicaid program data used here comes from Form HCFA-2082, Standard Report on Medical Care: Eligibles, Recipients, Payments, and Services, which HCFA collects from state Medicaid agencies on an annual basis. All 50 states except Arizona, plus the District of Columbia, are included in the data base. Form HCFA-2082 provides data on Medicaid expenditures and utilization, as well as unduplicated counts of Medicaid recipients, for each federal fiscal year. Because of problems in collecting the utilization data, however, only a small amount of utilization data is available for this analysis. Hence, our analysis rests mainly on expenditure

and recipient data. Even these data have some problems, but they have proven reliable enough for descriptive analyses such as this one.[1]

Exhibits 3.1 and 3.2 present national trends in total Medicaid expenditures and recipients, respectively, for the 1980 to 1987 period.[2] As can be seen in Exhibit 3.1, total Medicaid expenditures increased fairly steadily during the study years, averaging about 10 percent growth each year. The trend line flattens slightly, however, between 1983 and 1984. The percent increase in expenditures in 1984 was far lower than in any other study year (4.6 percent versus 8.1 percent or more in all other years), suggesting a possible effect of PPS (see below).

The trend in total recipients has been more uneven since 1980. After 1981, the number of Medicaid recipients declined for two years, as shown in Exhibit 3.2. The number of recipients began to rise again in 1984, with relatively large increases occurring in 1986 and 1987. This initial decline and subsequent increase correspond directly to the passage of major federal legislation affecting eligibility standards in 1981, 1985, and 1986.[3]

Trends in expenditures for the aged and in the number of aged recipients are presented in Exhibits 3.3 and 3.4. These graphs cover the subgroup of Medicaid recipients whose eligibility status is 65 years of age or over, and therefore exclude blind and disabled recipients age 65 and older. Even so, the Medicaid "aged" eligibility group approximates the population of individuals who are dually eligible under both Medicare and Medicaid.

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[1]HCFA edits the 2082 data when data are missing or obviously in error. See Cromwell & Hurdle (1986) for a discussion of HCFA's editing procedures.

[2]Tables with the corresponding numerical values and yearly percentage changes for each exhibit in this chapter are included in Appendix B.

[3]The 1981 Omnibus Budget Reconciliation Act (OBRA) tightened eligibility standards through more restrictive income and asset criteria as well as other restrictions. The Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1985 and the Sixth Omnibus Budget Reconciliation Act (SOBRA) of 1986 both broadened eligibility standards, mainly for pregnant women and children.

Exhibit 3.1
TOTAL MEDICAID EXPENDITURES

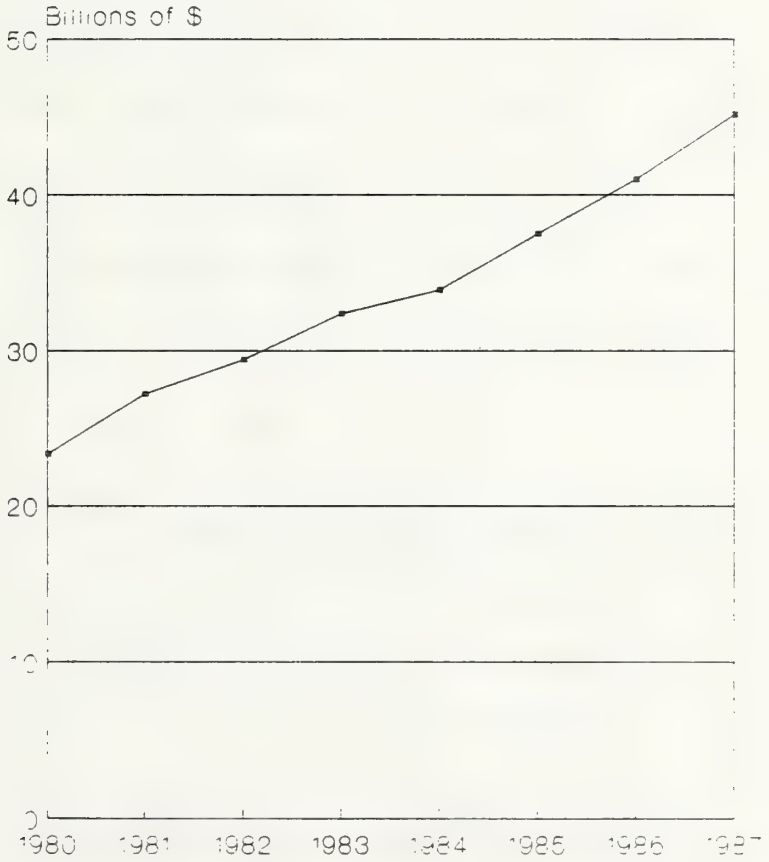


Exhibit 3.2

TOTAL MEDICAID RECIPIENTS

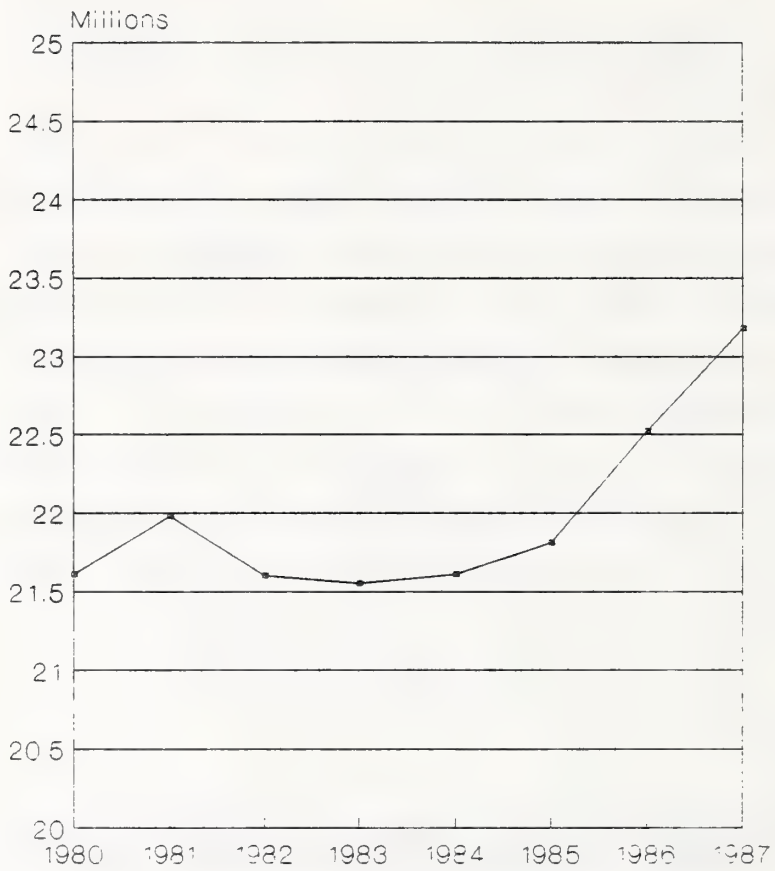
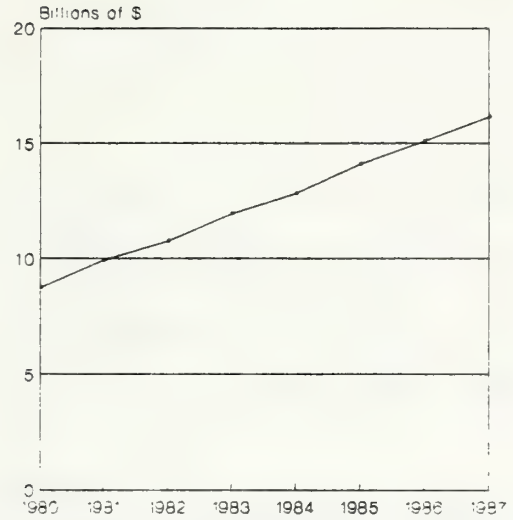
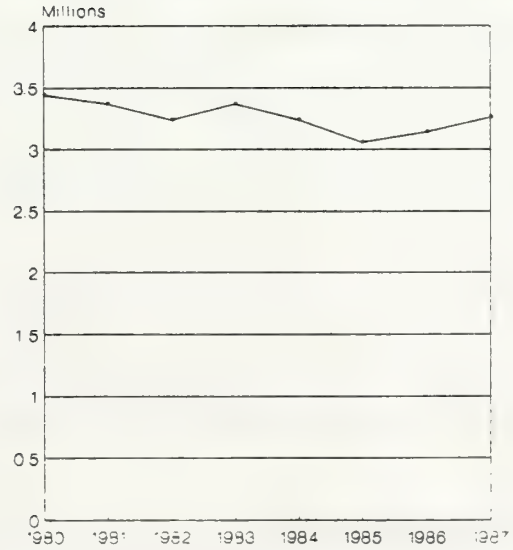


Exhibit 3.3
MEDICAID EXPENDITURES FOR AGED RECIPIENTS



Note: Aged recipients are those whose eligibility status is age 65 and over

Exhibit 3.4
MEDICAID AGED RECIPIENTS



Note: Aged recipients are those whose eligibility status is age 65 and older

As can be seen in Exhibit 3.3, total Medicaid expenditures for the aged have increased steadily throughout the study years. Like overall Medicaid spending, the average rate of increase for aged recipients is around 10 percent, with the highest yearly increase occurring in 1981 (13.6 percent) and the lowest in 1987 (6.9 percent). Unlike the overall picture, however, Medicaid spending on the aged shows only a mild downward break in trend with the advent of PPS in 1983-1984.

The trend line for the number of aged recipients in Exhibit 3.4 is fairly erratic. Prior to 1983, the number of aged recipients was declining at 2 to 4 percent per year. In 1983, however, the number increased by 4 percent, but began falling again in 1984 at about the same rate. The number of aged recipients started moving upward again in 1986 and 1987, at around 3 or 4 percent per year.

Finally, Exhibits 3.5 and 3.6 present Medicaid general hospital inpatient expenditures and recipients. This category of expenditures corresponds to the segment of the Medicare budget most directly affected by PPS. As shown in Exhibit 3.5, hospital expenditures prior to 1984 increased quite rapidly, at around 7 to 15 percent per year. In 1984, the trend line flattens out, a break that may be connected with the arrival of Medicare's PPS (see below). After 1984, hospital expenditures continued to increase, but at a slower rate (around 8 percent per year). Exhibit 3.6 shows that the number of inpatient hospital recipients under Medicare has been on a generally downward trend over the study years, with especially sharp drops in the immediate post-PPS years of 1984 and 1985 (6 and 12 percent, respectively).

The exhibits in this section have provided us with an overview of the trends in Medicaid expenditures and recipients in the 1980 through 1987 period. In the next section, we examine the breaks in trend more closely by focusing on expenditures per recipient. Once again, we look for evidence of PPS impacts around 1984, this time by disaggregating expenditures into several different service types and eligibility status.

3.2 Expenditures Per Recipient

Background. Medicaid expenditures are a function of four variables which directly affect the Medicaid program. These are:

Exhibit 3.5
MEDICAID GENERAL HOSPITAL
INPATIENT EXPENDITURES

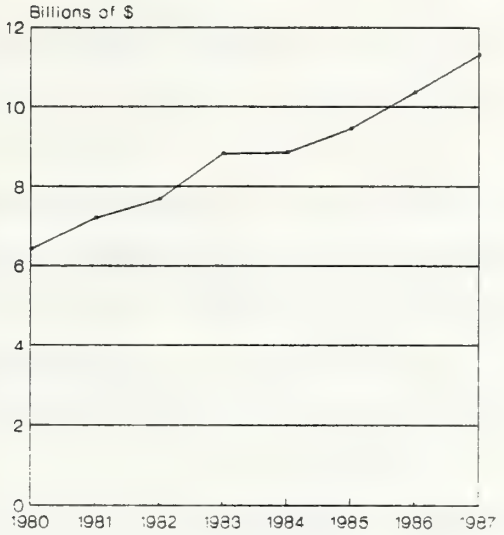
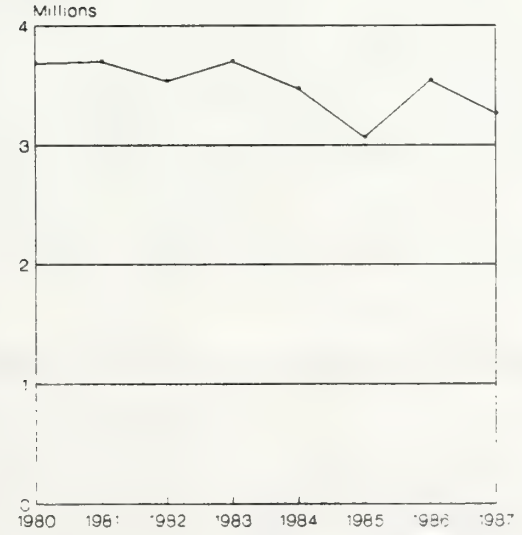


Exhibit 3.6
MEDICAID GENERAL HOSPITAL
INPATIENT RECIPIENTS



- the number and the health status of the nation's poor;
- health care utilization patterns among the poor;
- Medicaid program characteristics (including eligibility standards and reimbursement policies); and
- general health care price levels.

We hypothesize that PPS could affect Medicaid through three of these four variables; only the number and health status of the nation's poor is presumed to be uninfluenced by the Medicare reimbursement system. In contrast, our analysis in Chapter 2 showed that Medicaid program characteristics can and have been affected by PPS: several states have adopted versions of PPS for their Medicaid programs since 1983.

Medicaid eligibility standards are not as likely to have been influenced by PPS. However, if PPS was accompanied by overall increases in Medicaid costs (say, by shifting some of the costs of caring for the elderly away from the Medicare program), it may have added to the rising pressure to contain Medicaid costs by enacting more restrictive eligibility standards. While we do not have information on individual state legislative changes in eligibility standards, the major federal legislation in the post-PPS period clearly do not move in that direction. The only major restrictive legislation enacted during the study period came under the 1981 OBRA, prior to PPS. (OBRA made eligibility standards more restrictive in terms of income and assets and allowed states to restrict services to the medically needy and drop coverage for 18-20-year-old non-students. It also stiffened the disability requirements for SSI recipients.) In contrast, legislation enacted in 1985 and 1986 broadened eligibility standards, mainly for pregnant women and children.

The Medicare PPS program may also have changed overall physician practice patterns in a way that influenced inpatient hospital utilization and other types of care under Medicaid. Incentives embedded in PPS's per case reimbursement methodology have increased the attractiveness of patient care performed outside the hospital. Other research has shown substantial substitution of nursing home services, outpatient hospital services, and home health care for inpatient hospital care among aged Medicaid/Medicare

recipients. Moreover, the changes in care patterns induced by PPS may have gone beyond the elderly to affect non-elderly Medicaid patients as well.

The last variable on the list, general health care prices, may also have been affected by PPS. The success of hospitals at reducing their costs to meet the new PPS rates may have influenced the prices hospitals charge to other payers. As noted earlier, PPS also affected the prices paid by Medicaid in states that switched to prospective payment systems of their own. Because of the limited availability of utilization data, however, we are unable to examine these price effects independent of utilization changes: trends in expenditures and expenditures per recipient will reflect both factors.

The impact of PPS on Medicaid expenditures is likely to be strongest for inpatient hospital expenditures and its substitutes--nursing home, hospital outpatient, and home health care expenditures. Hence, we examine each of these expenditure categories separately in this section. Impacts may also vary between aged and non-aged Medicaid recipients, leading us to look at those two categories of expenditures separately.

All of the expenditure measures examined in this section are expressed on a per-recipient basis. Since changes in the number of recipients are unlikely to have been affected by PPS, we can abstract from those changes when considering PPS impacts.

Total Expenditures, by Age Level. Exhibits 3.7 and 3.8 present total Medicare expenditures per recipient and total Medicare expenditures for the aged per aged recipient, where "aged" are again defined as recipients with eligibility status of age 65 and over. The total expenditures per recipient trend line is basically the same--although on a different scale--as the total expenditure trend line described earlier (see Exhibit 3.1). Like Exhibit 3.1, a flattening of the trend line between 1983 and 1984 indicates possible PPS effects. Because of the rapid rise in Medicaid recipients in 1986 and 1987 (see Exhibit 3.2), however, the expenditures-per-recipient line shows slightly slower growth in later years.

The aged-expenditures-per-aged-recipient trend line in Exhibit 3.8 looks substantially different from the simple aged-expenditure trend line in Exhibit 3.3. Exhibit 3.8 shows that up through 1983, expenditures per aged

Exhibit 3.7
TOTAL MEDICAID EXPENDITURES PER RECIPIENT

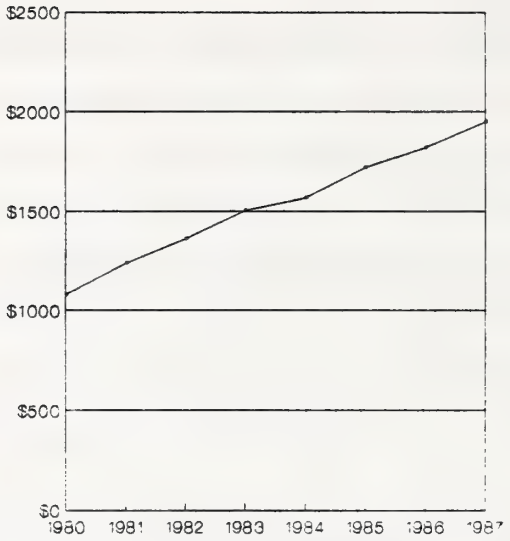
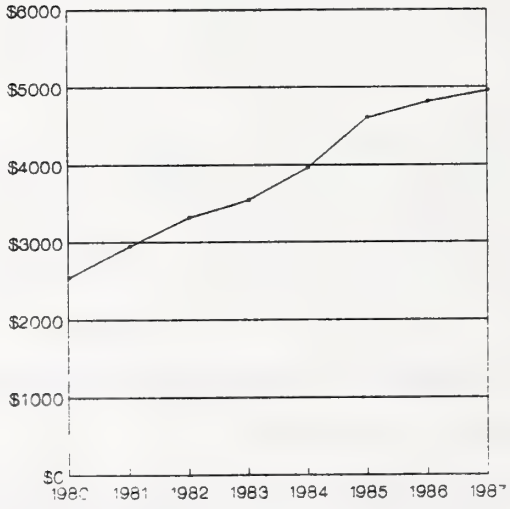


Exhibit 3.8
MEDICAID AGED EXPENDITURES PER AGED RECIPIENT



Note. Recipients and expenditures are for those whose eligibility status is age 65 and over

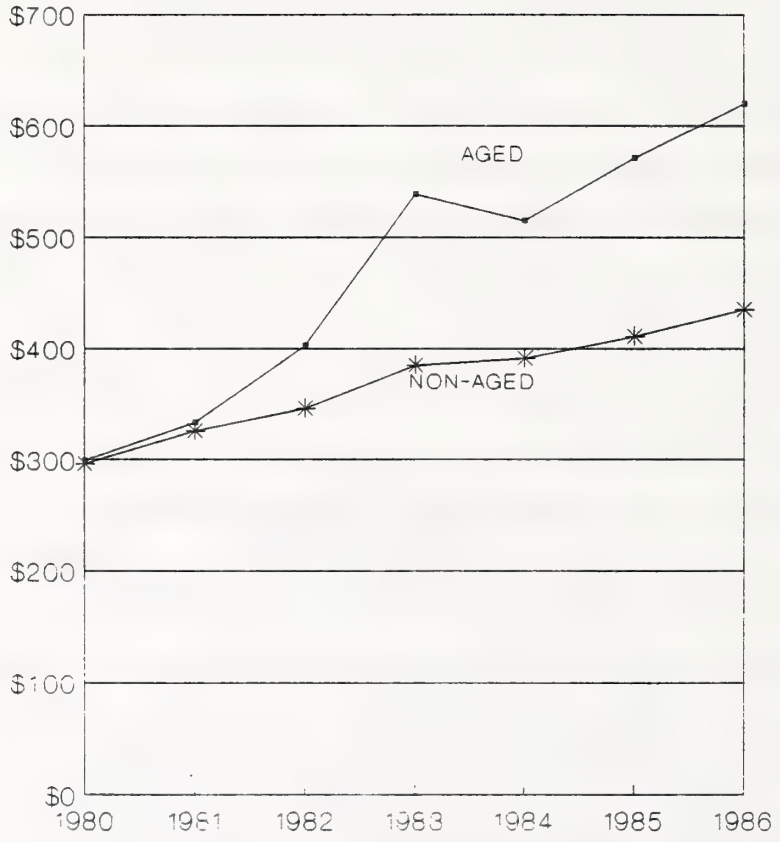
recipient were rising at a decreasing rate; the yearly growth rate fell from 16.1 to 7.0 percent between 1980 and 1983. After 1983, however, expenditures per aged recipient increased at a faster rate (12 to 16 percent annually) until 1986, when increases slowed even more drastically than in the pre-PPS years, to rates of 3 or 4 percent per year. Hence, there is little indication here that Medicare's PPS system restrained Medicaid spending on the dually eligible.

Expenditures by Type of Service. We look next at the decomposition of per capita expenditures among the four service types which PPS is most likely to have affected--hospital inpatient, hospital outpatient, nursing home, and home health care. Before beginning that analysis, however, three aspects of the data used to measure service-specific expenditures should be noted. First, unlike the overall data, the service-specific expenditure data are divided between aged and non-aged recipients using an actual age variable, so that aged expenditures cover all recipients age 65 and over, not just those whose eligibility status is age 65 and over. Unfortunately, recipient counts are still based on the aged eligibility status category, and therefore exclude blind and disabled recipients age 65 and over. Hence, expenditures for the aged blind and the aged disabled are included in the calculations, while the actual counts of aged blind and disabled recipients are not, leading to a slight upward bias in the per-recipient expenditure figures. Fortunately, only a small portion of blind and disabled Medicaid recipients are aged, so the bias should be both slight and fairly uniform over time.

Recipient counts are also unavailable by service type. Hence, the denominator used to calculate per-recipient expenditure levels by service type is total Medicaid recipients in every case, not inpatient hospital recipients, nursing home recipients, and so on. This will, of course, lower the per-recipient expenditure amounts, but should not greatly affect their time paths. Finally, expenditure data by type of service are available only through 1986, and not 1987.

Exhibit 3.9 presents inpatient hospital expenditures per capita for both the aged and the non-aged. Through 1983, expenditures per capita were rising quite rapidly for the aged, and at a more moderate rate for the non-aged. In 1983, for example, aged inpatient spending per capita increased by

Exhibit 3.9
INPATIENT HOSPITAL EXPENDITURES PER RECIPIENT



33 percent. After 1983, however, expenditures per aged recipient declined for one year, while non-aged expenditures continued their gradual climb. Growth in aged hospital spending resumed in 1985, but at a substantially slower pace than in the immediate pre-PPS years (10 percent per year, rather than 20 to 30 percent). The trend line for non-aged Medicaid recipients also flattened considerably in 1984 and moved upward thereafter at a slower pace than in the pre-PPS period (5 percent per year, rather than 10 percent).

The slowdown in per capita hospital spending under Medicaid in 1984 coincides with the first year of PPS implementation. While both the aged and the non-aged trend lines reflect this slowdown, the difference in the Medicaid liability for the hospital care costs of these two groups may have caused significant differences in the two trends. We discuss those differences below.

Almost all Medicaid aged recipients are also Medicare beneficiaries and are known as dual enrollees. For dual enrollees, Medicare is the first payer of hospital expenses, while Medicaid covers the beneficiaries' out-of-pocket expenses only. Those expenses split into three components: a deductible equal to the cost of one day's hospital stay ($492 in 1986); coinsurance equal to 25 percent of the deductible per day for the 61st through 90th days of hospital care, and full charges beyond the 90th day. The fact that Medicaid hospital expenditures per aged recipient declined in 1984 suggests that the Medicare PPS system had an impact on one or more of these components. Two of the most frequently reported effects of PPS on the Medicare program--a decline in the average length of stay and a surprising decrease in admissions--would indeed have led to this result: lower admission rates would have decreased the number of dually-eligible recipients whose deductible was paid through Medicaid, while declining lengths of stay would have decreased the number of Medicaid-covered days in stays of more than 60 days.

The observed increase in inpatient hospital expenditures for the aged in 1985 and 1986 may also be attributable to PPS. Decreasing lengths of stay may have led to increases in per diem rates under Medicare and Medicaid, and also to increases in the Medicare deductible (which is equal to the cost of one day of inpatient hospital care). In fact, the 23 percent rise in the

deductible in 1986 (from $400 to $492) has been attributed to PPS in an earlier study.[4]

In contrast to its role in financing health care for the dually eligible, Medicaid is the first and only payer for inpatient hospital care for non-aged Medicaid recipients. Hence, new reimbursement rates for the aged under Medicare do not directly affect non-aged Medicaid costs. Even so, the flattening of the non-aged trend line between 1983 and 1984 may have been due to PPS, if the changes in provider practice patterns for Medicare beneficiaries discussed above (i.e., fewer and briefer hospital stays) carried over to non-aged Medicaid recipients.

The slowdown in the growth of inpatient hospital care in 1984 may have been accompanied by an offsetting increase in the growth of other types of Medicaid payments. Exhibits 3.10, 3.11, and 3.12 present data for three closely related service types--nursing home, outpatient hospital, and home health care. We begin with nursing home expenditures per aged and non-aged recipient in Exhibit 3.10. As can be seen, nursing home expenditures per recipient for the aged show increases after 1983 that are much like those before 1983, averaging 9 percent per year in both the 1981-83 period and the 1984-86 period. The small rise in 1983--only 1.6 percent--is consistent, however, with the large increase in per capita inpatient hospital expenditures for the aged in that year (see Exhibit 3.9). The non-aged nursing home expenditure trend line in Exhibit 3.10 shows the same pattern: expenditures per recipient grew steadily through 1983 and continued to grow after 1983 at a slower rate.

It is not entirely surprising that the nursing home sector did not expand rapidly as per capita inpatient expenditure growth tapered off in the post-PPS period. Most states exercise tight control over the supply of nursing home beds through certificate-of-need programs. As a result, the demand for nursing home beds exceeded the available supply in most states throughout the 1980s, and even when available, beds were often provided to private-pay patients ahead of Medicaid eligibles. Hence, to the extent that

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[4]See the U.S. Department of Health and Human Services, Report to Congress: Impact of the Medicare Hospital Prospective Payment System, 1985 Annual Report.

Exhibit 3.10
NURSING HOME EXPENDITURES PER RECIPIENT

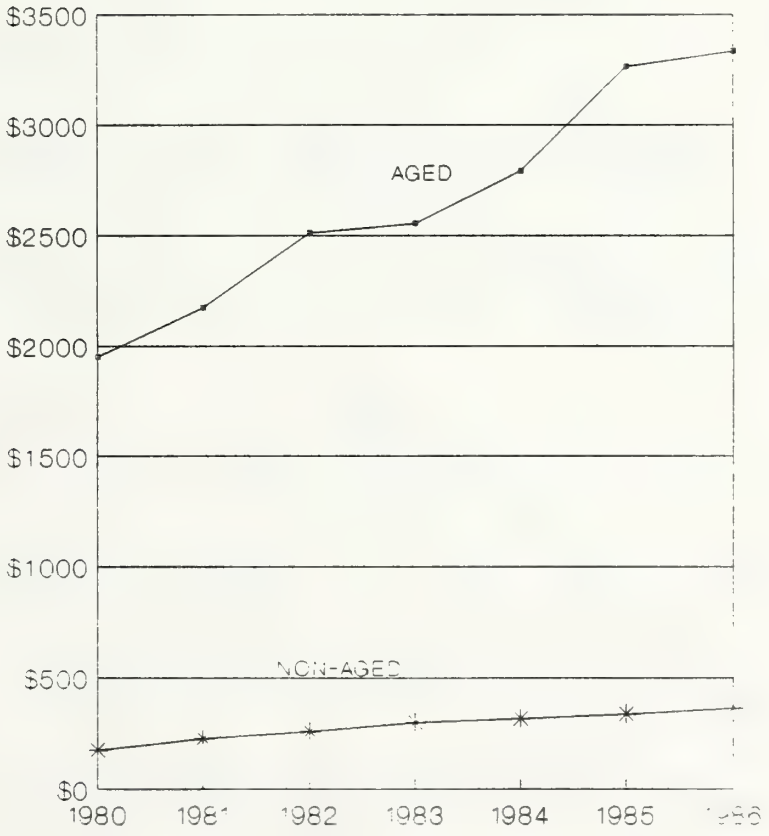


Exhibit 3.11
OUTPATIENT HOSPITAL EXPENDITURES PER RECIPIENT

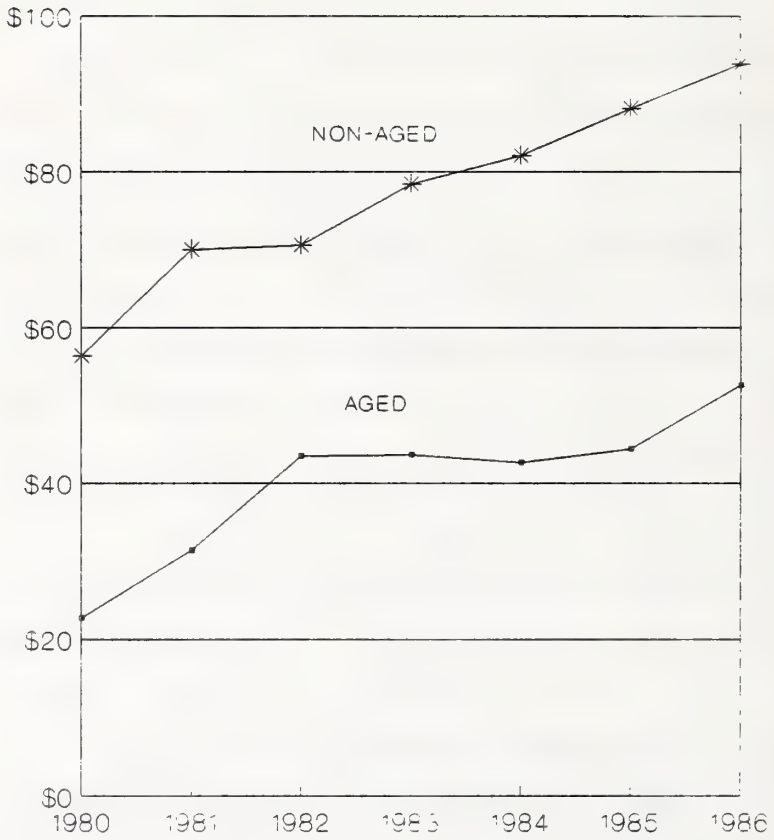
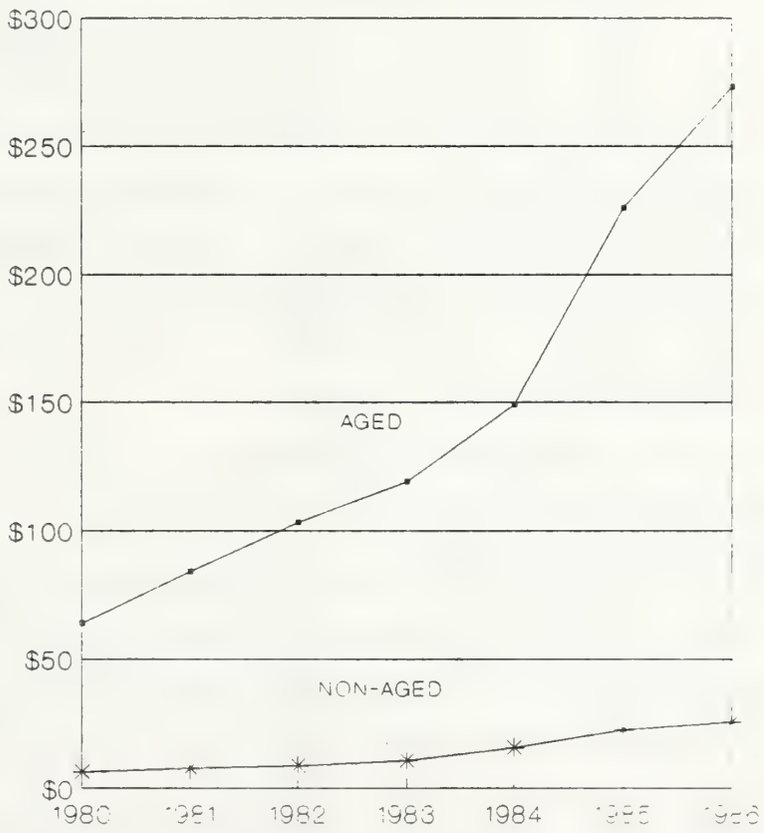


Exhibit 3.12
HOME HEALTH CARE EXPENDITURES PER RECIPIENT



PPS limited the growth of inpatient hospital care for the aged poor, substitute care had to be provided outside of the nursing home sector.

Another possible substitute for inpatient hospital care is outpatient hospital care. Medicaid outpatient expenditures per recipient are shown in Exhibit 3.11. For aged recipients, outpatient expenditures rose rapidly prior to 1983. In 1983, they increased only .5 percent and then declined slightly in 1984. A small increase in 1985 (4 percent) was then followed by a large jump in 1986 (19 percent). For the non-aged, outpatient expenditures per recipient leveled off in 1982, but then increased steadily at about an 8-percent annual pace beginning in 1983.

These two trend lines taken together show some indication that the growth rate of outpatient care for the non-aged may have increased under PPS, but certainly not for the aged. This pattern is consistent with the view that non-aged recipients are more able than aged recipients to substitute early discharges and outpatient follow-up visits for extended inpatient stays. Typically, aged recipients suffer from chronic conditions requiring continuous post-hospital care. For that population, earlier discharges could only occur if home health care were available.

Exhibit 3.12 confirms this hypothesis. It shows the trend line for home health care expenditures per recipient for the aged and non-aged. As can be seen, Medicaid spending on home care per aged recipient increased steadily--but at a decreasing rate--between 1980 and 1983. After 1983, however, home health expenditures grew much faster--33 percent on average versus 23 percent in the earlier period. The increase in 1985 alone exceeded 50 percent. Non-aged home care expenditures show much the same trend, with the largest one-year increase (46.8 percent) occurring in 1984. Hence, the home health industry clearly provided much of the substitute care needed when inpatient hospital expenditures declined in the post-PPS period.

Table 3.1 shows Medicaid expenditures by type of service for selected years as a percent of total Medicaid expenditures, total aged expenditures, and total non-aged expenditures. Here, we see how the composition of Medicaid expenditures for these three groups changed between the years of 1980, 1983, and 1986. As can be seen, the share of inpatient hospital expenditures dropped over that period and accounted for a lower

Table 3.1

Medicaid Expenditures By Type of Service,
As a Percent of Total Medicaid Expenditures - Selected Years

Type of Service	1980	1983	1986
		All Expenditures	
Inpatient Hospital	27.5	27.2	25.3
Nursing Home	42.4	43.5	42.7
Outpatient Hospital	4.7	4.9	4.8
Home Health Care	1.4	1.8	3.3
Other	24.0	22.6	23.9
		Aged Expenditures	
Inpatient Hospital	11.8	15.2	12.9
Nursing Home	76.7	72.0	69.3
Outpatient Hospital	.9	1.2	1.1
Home Health Care	2.5	3.4	5.7
Other	8.1	8.2	11.0
		Non-Aged Expenditures	
Inpatient Hospital	37.0	34.2	32.5
Nursing Home	21.8	26.8	27.2
Outpatient Hospital	7.0	7.0	7.0
Home Health Care	.8	1.0	1.9
Other	33.5	31.1	31.4

Source: HCFA 2082 Medicaid data.

proportion of all expenditures and of non-aged expenditures in 1986 than in 1980 and 1983 (down to 25 and 33 percent, respectively, from around 27 and 35 percent). For the aged, inpatient hospital expenditures also accounted for a lower proportion of total spending in 1986 (13 percent) than in 1983 (15 percent), but the proportion in 1986 was higher than in 1980 (12 percent). The proportion of expenditures accounted for by nursing home care (43 percent) barely changed over the 1980-1986 period for all recipients. It fell, however, for aged recipients (from 77 percent in 1980 to 72 percent and then 69 percent in 1983 and 1986) and rose for non-aged recipients (from 21 percent in 1980 to 27 percent in 1983 and 1986). The proportion of expenditures going to outpatient hospital care remained constant for all three categories, at 1 percent for the aged, 7 percent for the non-aged, and 5 percent overall. Finally, home health care expenditures rose in relation to the total for all three categories of recipients: from 2.5 to almost 6 percent for the aged, and from around 1 percent to 2 percent for the non-aged.

The numbers presented in Table 3.1 tend to reconfirm our earlier conclusions about PPS impacts, i.e., that PPS led to a change in physician practice patterns toward all Medicaid recipients, resulting in a switch from inpatient hospital care to home health care and (for the non-aged) outpatient hospital care. Table 3.1 shows a corresponding drop in the proportion of Medicaid expenditures going to inpatient hospital care for both the aged and non-aged in the post-PPS period, and the corresponding increase in the proportion spent on home health care for both groups. From our earlier discussion, we would also have expected to see an increase in the percentage of non-aged expenditures accounted for by outpatient hospital care in the post-PPS period, but instead the portion of non-aged expenditures remained the same in 1986 as it was in 1983. Our conclusion that nursing homes generally did not serve as a substitute for inpatient care for Medicaid recipients is also partly confirmed by Table 3.1--the percentage of aged expenditures accounted for by nursing home care dropped in the post-PPS period, while the percentage of non-aged expenditures spent on nursing home care increased.

3.3 Conclusions

This chapter examined possible PPS impacts on Medicaid program outcomes. The time-trend analysis presented here suggests that PPS may indeed

have affected Medicaid expenditures through changes in provider care patterns. A clear decrease in the rate of growth of total Medicaid expenditures per recipient was found in the post-PPS years. Downward breaks in trend were also evident for both aged and non-aged inpatient hospital expenditures per recipient, a result that suggests that inpatient hospital care was used more judiciously for the Medicaid population in the post-PPS period. It is interesting to note that this pattern evolved for both aged and non-aged Medicaid recipients, with outpatient hospital care for the non-aged and home health care for both groups taking up some of the slack. Nursing home care does not appear to have experienced any accelerated growth in expenditures due to PPS, a finding that may be explained as a result of the tight supply of nursing home beds in most states over the 1983 to 1986 period.

STATE-LEVEL ANALYSIS

In Chapter 3, we presented evidence of PPS effects on national Medicaid program outcomes. It is clear from Chapter 2, however, that the national picture reflects an aggregate of outcomes from a variety of state hospital reimbursement programs, including retrospective, prospective, and DRG-based approaches. In this chapter, we analyze those outcomes separately for the different types of state reimbursement systems. Section 3.1 examines Medicaid inpatient hospital expenditures per Medicaid recipient, while Section 3.2 presents a corresponding analysis of total Medicaid expenditures per recipient. Section 3.3 examines inpatient hospital expenditures per covered day for the years 1984-1986 in a selected set of states, and Section 3.4 presents our conclusions.

4.1 Inpatient Hospital Expenditures Per Recipient

For this analysis, states have been divided into three groups: (1) states which had retrospective hospital reimbursement systems in 1980 and stayed with retrospective systems through 1987 (retrospective systems); (2) states which had retrospective systems in 1980 but switched to non-DRG prospective systems by 1985 (retro-to-pro systems); and (3) states which had retrospective systems in 1980 and switched to DRG-based systems by 1985 (retro-to-DRG systems). Thirty-seven states are included in these three groups.[1]

Exhibit 4.1 presents hospital expenditures per Medicaid recipient for the retrospective and retro-to-pro states.[2] In 1980, the baseline year in which all state systems were retrospective, retro-to-pro states had lower average inpatient hospital expenditures per recipient than their counterparts in the retrospective group. Through the transition years, 1981-1985, when the retro-to-pro states gradually adopted non-DRG prospective systems, the retro-to-pro trend line dropped further below the retrospective trend line at a

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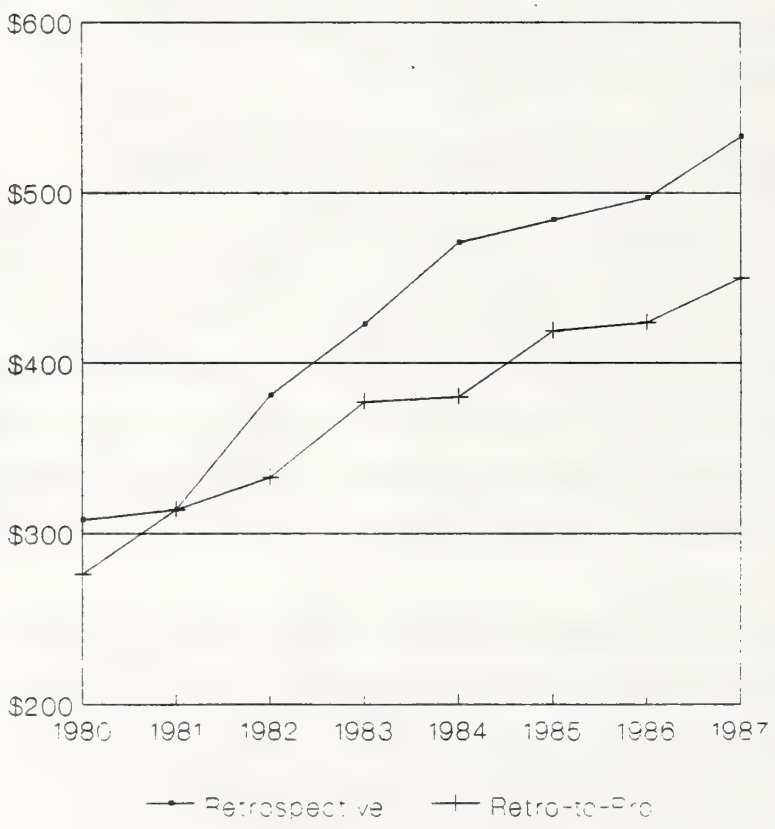
[1]A list of states in each category can be found in Table C.1 of Appendix C.

[2]Tables that show the corresponding numbers for each exhibit in this chapter appear in Appendix C.

Exhibit 4.1
HOSPITAL EXPENDITURES PER RECIPIENT BY STATE SYSTEM TYPE



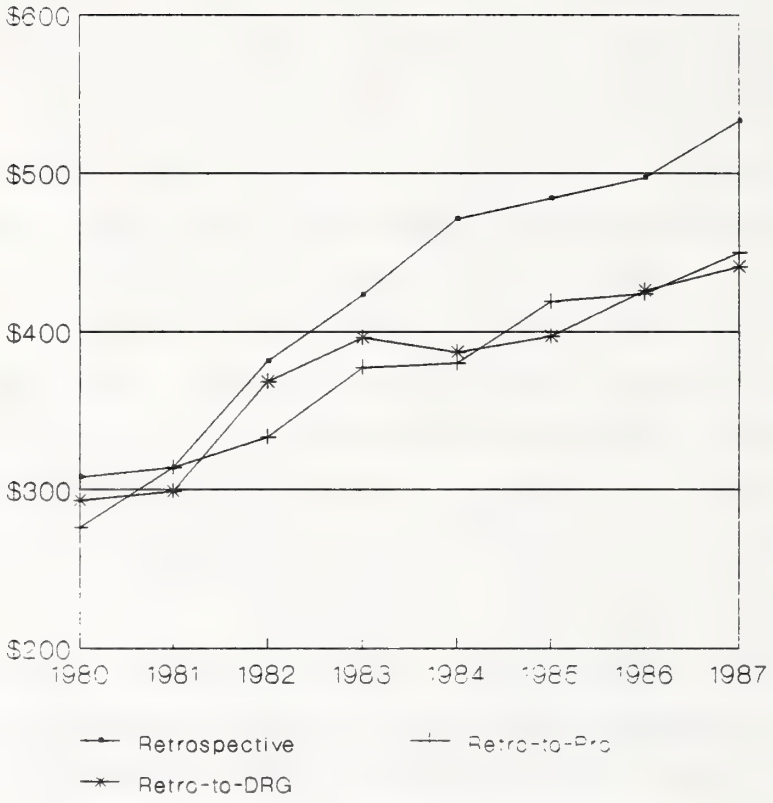
fairly steady pace. That separation was maintained in 1986 and 1987, where the retro-to-pro line represents only non-DRG prospective systems. Hence, the exhibit leaves little doubt that the states that switched to non-DRG-based prospective systems between 1981 and 1985 were more successful than their retrospective counterparts in controlling the growth of Medicaid hospital expenditures per recipient.

As we saw in Chapter 3, when Medicare implemented its PPS in 1983, state Medicaid programs stopped moving toward non-DRG prospective payment models and turned instead to DRG-based systems. The new DRG states are represented by the retro-to-DRG trend line in Exhibit 4.2, which is otherwise the same as Exhibit 4.1. In the baseline period before the DRG systems were implemented (1980-1982), the retro-to-DRG trend line closely paralleled the steeply sloped retrospective line. In the transition years, however, (1983-1985), the retro-to-DRG line flattened out and moved closer to the lower (and flatter) retro-to-pro line. Beginning in 1985, after all systems changes were complete, the retro-to-DRG line remained at or below the level of the retro-to-pro line, and well below the retrospective line.

Based on these trends, we conclude that the DRG states fared better in terms of hospital expenditures per person than both the retrospective and retro-to-pro states. Over the entire study period, retrospective states' hospital expenditures per recipient increased an average of 8.3 percent per year, while retro-to-pro states increased an average of 7.4 percent. In contrast, hospital expenditures per recipient in the retro-to-DRG states increased only 6.3 percent per year. If growth rates for the baseline period (1980-1982) are excluded, the average increase along the DRG line drops to 3.7 percent, far lower than either of the other two categories.

Given the differences in the incentives inherent in the different reimbursement approaches (i.e., the difference between per-diem and per-case payment), it is not surprising that DRG-based systems are better at controlling hospital costs. It is possible, however, that by inducing hospitals to discharge patients sooner, the DRG-based per-case systems may also have <u>increased</u> the need for other types of care. Hence, we would expect that while successful at controlling hospital costs, the DRG systems might not have performed as well in other areas. We examine this question in the next section.

Exhibit 4.2
HOSPITAL EXPENDITURES PER RECIPIENT BY STATE SYSTEM TYPE



To complete our analysis of hospital expenditures, the final exhibit in this section, Exhibit 4.3, adds hospital expenditures per recipient for states which switched to DRGs after 1985. The "retro-to-DRG '86" category shown here includes the two states that switched to DRG-based systems in 1986, South Carolina and Texas. As can be seen from the exhibit, the switch to DRGs for these two states was accompanied by a large increase in hospital expenditures per recipient in the first year of the program (1986), followed by a smaller decline in 1987. The states that implemented DRG systems in 1987--Iowa and Montana--also experienced a substantial rise in hospital payments per recipient in the first year of their programs. Hence, based on the early evidence, it is unclear whether the most recent DRG states have not done as well as earlier DRG states at controlling hospital costs.

4.2 Total Expenditures Per Recipient

This section examines total Medicaid expenditures per recipient using the same classification of states as in the prior section. Within that framework, Exhibit 4.4 presents trend lines in expenditures per recipient over the 1980-1987 period for retrospective and retro-to-pro states. As can be seen, the trend lines are quite similar to those for hospital spending shown in Exhibit 4.1. As before, expenditures per recipient in the retro-to-pro states are below those in the retrospective states at baseline (in 1980), over the transition period (1981-1985), and beyond, with the difference growing from $315 in 1980 to $880 by 1987. This is strong evidence that the (non-DRG) prospective approach is more effective than cost-based retrospective systems at limiting the growth of Medicaid spending.

Adding the "retro-to-DRG" trend line to Exhibit 4.4 gives Exhibit 4.5. At first glance, it would seem that our expectations about DRG-based systems discussed above--that they would be less successful at containing overall Medicaid costs than hospital costs alone--were correct, since the DRG line in Exhibit 4.5 lies well above the non-DRG prospective payment line over most of the graph, and near the retrospective line. However, a closer examination reveals a flatter trend line for the retro-to-DRG states in the transition years and beyond (1983-1987), than for either the retrospective or retro-to-pro states. In fact, the growth in average yearly Medicaid expenditures per recipient for the retro-to-DRG states is only

Exhibit 4.3
HOSPITAL EXPENDITURES PER RECIPIENT BY STATE SYSTEM TYPE

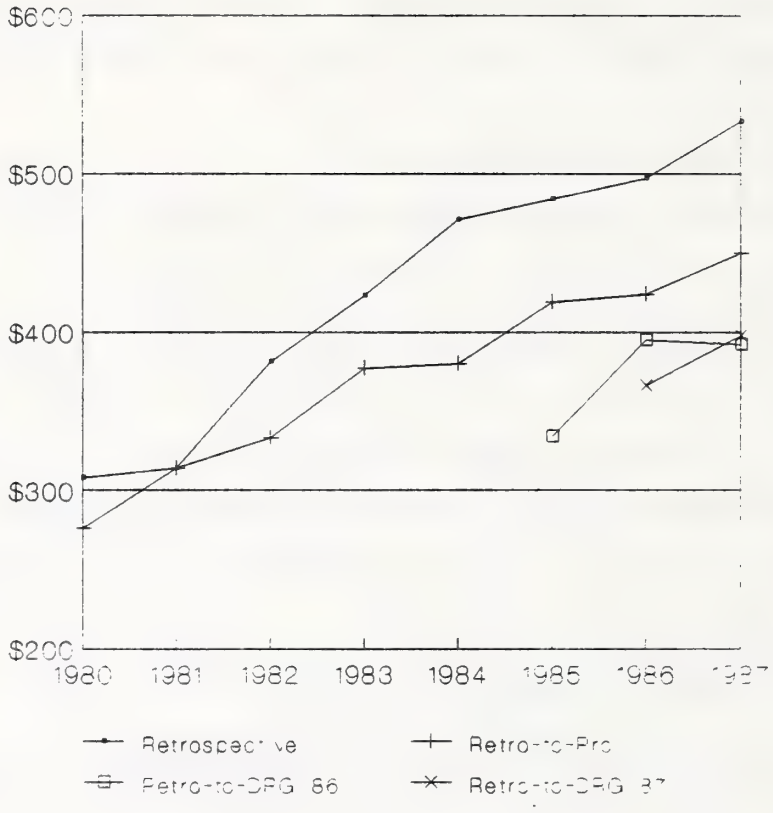


Exhibit 4.4
TOTAL EXPENDITURES PER RECIPIENT BY STATE SYSTEM TYPE

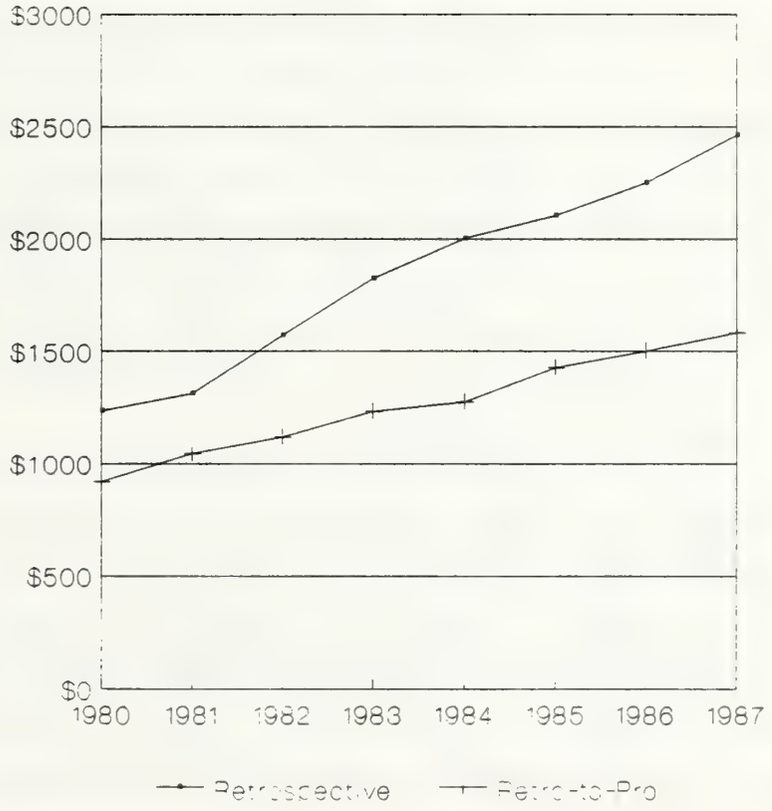
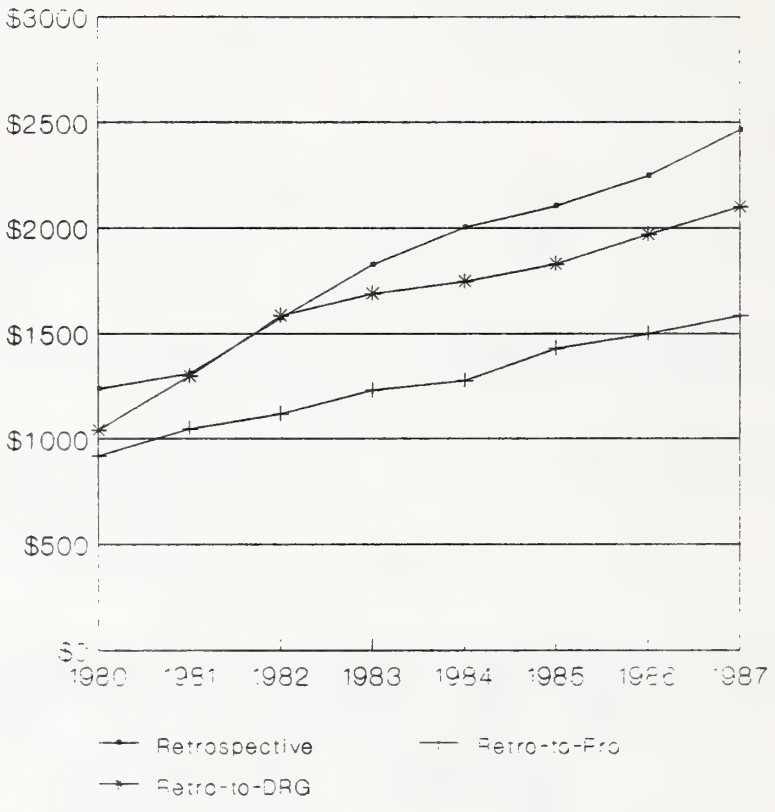


Exhibit 4.5
TOTAL EXPENDITURES PER RECIPIENT BY STATE SYSTEM TYPE



5.8 percent between 1983 and 1987, compared with 10.5 percent annual growth in the retrospective states over the entire study period and 8.1 percent growth in the retro-to-pro states over that period. The 2.3 percentage point difference between the average growth rates for the DRG versus non-DRG prospective states is especially striking, and actually exceeds the corresponding difference in inpatient hospital expenditure growth rates from Exhibit 4.2 (2.0 percentage points). Hence, the slower growth rate of inpatient hospital expenditures observed here has certainly not been offset by higher growth rates elsewhere, such as in the nursing home, outpatient hospital, and home health areas.

Exhibit 4.6 shows total Medicaid expenditures per recipient for the "retro-to-DRG '86" and "retro-to-DRG '87" states in relation to the original retrospective and retro-to-pro lines from Exhibit 4.4. In the short timeframe in which we can assess the impact of the new DRG systems in these states, it appears that those states that switched to DRGs in 1986 may have substantially lowered their total Medicaid expenditures per recipient compared to other states, while those that switched in 1987 have done about as well as other non-DRG-based prospective states.

4.3 Daily Rates for Inpatient Hospital Stays

As noted earlier, Form HCFA 2082 provides only limited data on Medicaid utilization during the post-PPS period. In this section, we use those data to construct cost-per-day estimates for inpatient hospital stays under Medicaid over the 1984-1986 period. Reliable utilization data are not available for any other years in the study, or for any other service types.

We begin by calculating per diem payment rates for inpatient hospital stays in each state, dividing total hospital outlays by total covered days. We then focus on the states that switched from retrospective to prospective systems (including DRG-based systems) in the 1984-1986 period. In order to take account of preexisting differences between these groups of states, we restrict our attention to states with retrospective systems in 1984. Most of those states remained retrospective through 1986 (the states included in the retrospective category in our previous analysis); their per diem inpatient hospital expenditures for 1984-1986 appear along the "retrospective" line in Exhibit 4.7. Three other states switched from

Exhibit 4.6
TOTAL EXPENDITURES PER RECIPIENT BY STATE SYSTEM TYPE

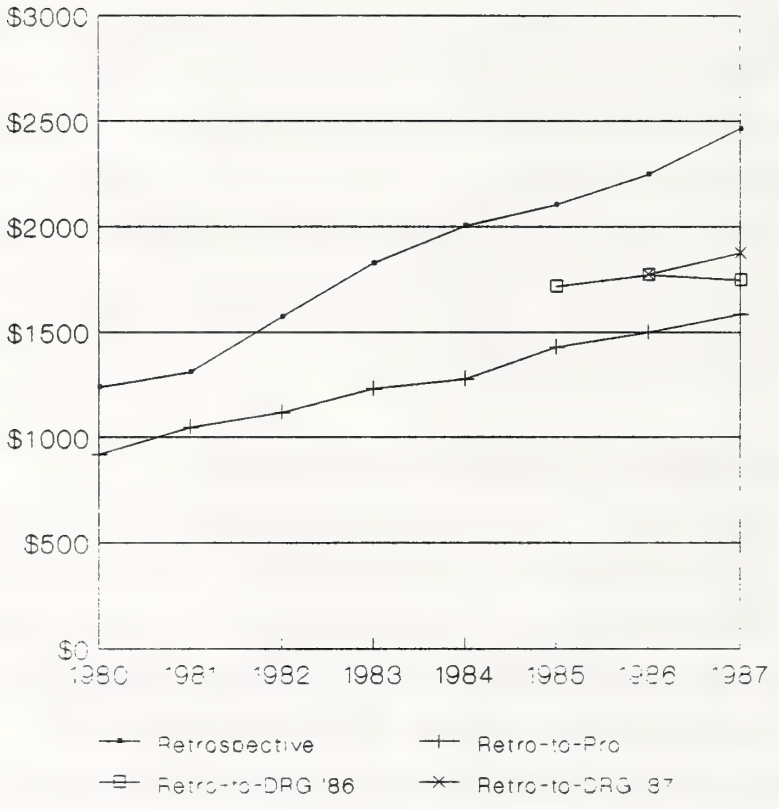
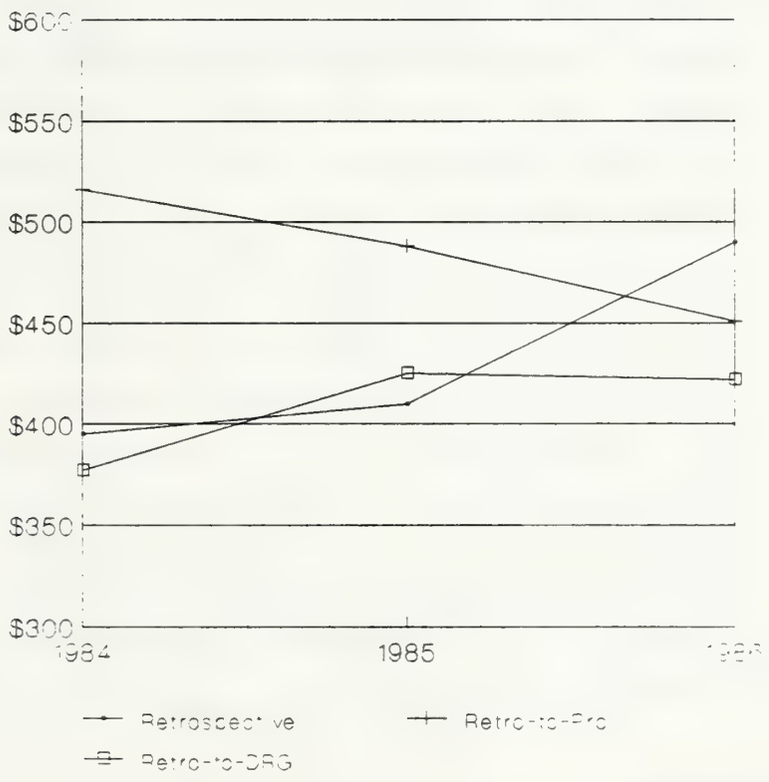


Exhibit 4.7

HOSPITAL EXPENDITURES PER COVERED DAY



retrospective to non-DRG-based prospective systems in 1985: Alaska, Hawaii, and New Mexico. Per diem rates for this group are shown in the "retro-to-pro" line in Exhibit 4.7. Finally, the two retrospective states that adopted DRG-based prospective systems in 1985--South Dakota and Washington--appear in the "retro-to-DRG" line of the exhibit. Changes in reimbursement systems in 1986 are not considered here in this analysis due to the limited followup data available (only one year).

The pattern of responses shown in Exhibit 4.7 suggests that both DRG-based and non-DRG-based prospective systems have held down per diem hospital expenditures under Medicaid relative to the upward trend exhibited by the retrospective states. The contrast is especially striking for non-DRG prospective systems, which experienced 5 and 8 percent declines in per diem rates in 1985 and 1986 as the retrospective rates rose 4 and 20 percent, respectively. In contrast, DRG-based systems made little progress against the retrospective benchmark; more rapid growth (13 percent) in 1985, followed by a slight decline (1 percent) in 1986. Even so, the two-year increase in DRG per diem payments was only 12 percent, compared to a 24-percent increase for the retrospective states and a 13-percent decline for the other prospective states. This contrast between the DRG and non-DRG prospective states--12-percent growth versus 13-percent decline--is not so surprising when one considers that DRG systems are meant to limit inpatient hospital expenditures by reducing the number of covered days, not the price per day. Unlike the DRG approach, however, other prospective systems do not seek to limit the number of days of inpatient care, concentrating instead on per diem price reductions of the sort shown in Exhibit 4.7.

4.4 Conclusions

In this chapter, we compared the performance of three types of Medicaid inpatient hospital reimbursement systems--retrospective, non-DRG-based prospective, and DRG-based prospective--in three areas: inpatient hospital expenditures per recipient, inpatient hospital expenditures per day, and total expenditures per recipient. By comparing trends in these outcome measures between states that have recently adopted prospective payment systems and states that remain retrospective, we discovered some interesting contrasts. Specifically, it appears that both types of prospective payment

systems--and especially DRG-based systems--have been successful in reducing the growth of inpatient hospital expenditures per recipient. This has been accomplished in the case of the DRG systems by reducing the number of covered days, and in the case of non-DRG systems by reducing per diem payments.

Findings on overall Medicare expenditures per recipient are also quite encouraging. Somewhat surprisingly, the successes of the DRG states in limiting the growth of inpatient hospital services also carry over to other types of services; evidently, less money spent on hospital care does not mean greater expenditures for other types of services. As a result, we find that both non-DRG and, especially, DRG prospective payment systems have considerably outperformed traditional cost-based reimbursement systems in limiting the growth of overall Medicaid spending per recipient.

SUMMARY AND CONCLUSIONS

Much has changed in the world of state Medicaid programs since Medicare implemented its Prospective Payment System (PPS) for inpatient hospital care in 1983. Looking at the contrasting patterns in Medicaid program outcomes over the pre- versus post-PPS period (1980-1983 versus 1984-1987), it is evident that PPS prompted many states to adopt similar DRG-based systems and led to lower growth rates in overall Medicaid outlays.

Thirteen states made the transition to DRG-based reimbursement for Medicaid inpatient services between 1983 and 1987, with as many as eight additional states likely to join that group in the next few years. This movement represents a substantial break from the pre-PPS trend of adopting prospective, but not DRG-based, systems.

The conversion of state Medicaid programs to the DRG-approach--and possibly other less direct effects of PPS--appears to have produced Medicaid program savings in several areas. At the national level, Medicare spending on the aged on inpatient hospital care, and on all services combined show somewhat lower growth rates in the post-PPS years. Breaks in trend are particularly evident for total expenditures per recipient and inpatient hospital expenditures per hospital recipient in 1984, the first year following the implementation of Medicare's PPS. This suggests that the advent of PPS has had a restraining influence on overall Medicaid spending per recipient, particularly in the hospital area. While growth rates for home health care and outpatient hospital care seem to have increased somewhat as a result, the net result is generally favorable to Medicaid budgets.

It is notable that Medicaid savings under PPS accrued not just to aged recipients (who also receive Medicare benefits), but also to non-aged Medicaid beneficiaries. Presumably, this carry-over occurred for two reasons: as the result of the changeover of state Medicaid programs to DRG-based hospital reimbursement for <u>all</u> recipients and, possibly, because changes in physician practice patterns for the aged (i.e., less reliance on inpatient hospital care) carried over to the Medicaid population in general.

Whatever its indirect effects, the advent of PPS was especially beneficial to those states that adopted similar systems under Medicaid. The growth of Medicaid spending per recipient and, especially, the inpatient

hospital component of that spending, have declined in states that shifted to DRG-based systems relative to states that stayed with retrospective systems. It is less clear, however, that DRG-based systems have outperformed the other, non-DRG-based prospective systems that were adopted just prior to the arrival of Medicare's PPS.

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Appendix A

Table A.1 Listing of States With Each Reimbursement Type, by Year

Type of System	1980	1981	1982	1983
Retrospective Systems				
Cost	AL IN NE SC AK IA NV SD AR KS NH TN CT KY NM TX DE LA NC UT DC ME ND VT FL MN OH VA GA MS OK WA HI MO OR WV IL MT PA WY	AL LA OK WA AK ME OR WV AR MN PA WY CT MT SC DE NE SD DC NV TN HI NH TX IN NM UT IA ND VT KS OH VA	AK MT TN AR NV UT CT NH VT DE ND WA DC OH WV HI OK WY IN OR KS PA ME SC MN SD	AK PA AR SC DE SD HI WA IN WV ME WY MT NH ND OH
Cost-to-trend	CA ID	CA WI ID	ID NM WI LA TX	CT LA TX ID NM
Cost-to-trend with Peer	NY	GA NY	CA NY GA	CA WI
Prospective Systems				
Base-trended	MD MA MI	FL NC IL MD MA MI MO	FL NE IA NC IL MD MA MO	FL MN TN GA MO IA NE KS NC MD OK MA OR
Base-Trended with Peer	CO	CO KY MS	AL CO KY MI MS VA	AL NV CO NY IL VA KY MI MS
Flat Rate by Group	NJ	NJ	NJ	NJ UT
Negotiation/ Contract	RI WI	RI	AZ RI	AZ DC VT CA RI

Continued . . .

Table A.1 Listing of States With Each Reimbursement Type, by Year
(continued)

Type of System	1984	1985	1986	1987
Retrospective Systems				
Cost	AK WA DE WV HI WY IN ME MT NH ND SC SD	DE IN ME MT NH ND SC WV WY	DE IN MT NH ND WV WY	DE IN NH ND UT WV WY
Cost-to-trend	CT LA TX ID NM	CT ID NM DC LA TX	CT ID NM DC LA	CT ID NM DC LA
Cost-to-trend with Peer	CA WI	CA WI	CA WI	CA WI
Prospective Systems				
Base-trended	AR MD OK CO MA OR FL MN TN GA MO IA NE KS NC	AK KS NC AR MD OK CO MA TN FL MO GA NE IA NM	AK KS NC AR ME OK CO MD TN FL MA GA MO IA NE	AK MD TN AR MA FL MO GA NE KS NC ME OK
Base-trended with Peer	AL NV CO NY IL VA KY MI MS	AL NV CO NY HI VA IL KY MS	AL NV CO NM HI NY IL VA KY MS	AL NM HI NY IL VA KY MS NV
Flat Rate by Group	NJ OH PA UT	MI PA MN SD NJ UT OH WA OR	MI PA WA MN SC NJ SD OH TX OR UT	CO NJ SD IA OH TX MI OR UT MN PA WA MT SC
Negotiation/ Contract	AZ DC VT CA RI	AZ IL VT CA RI	AZ IL VT CA RI	AZ IL VT CA RI

Table A.2

General Hospital Inpatient Expenditures
in States With Prospective Systems
(as a percent of total general hospital inpatient expenditures)

Year	DRG-Based Systems	All Prospective Systems
1980	2.64	19.23
1981	2.65	31.49
1982	2.87	32.93
1983	3.11	75.59
1984	12.64	85.56
1985	20.68	87.12
1986	26.00	91.77
1987	27.14	91.75

Source: HCFA 2082 Medicaid data.

Note: Expenditures for states with two reimbursement systems are included under the reimbursement system type which covers the majority of the expenditures.

Table A.3

General Hospital Inpatient Recipients
in States With Prospective Systems
(as a percent of total general hospital inpatient recipients)

Year	DRG-Based Systems	All Prospective Systems
1980	2.93	15.73
1981	2.56	31.79
1982	2.75	35.98
1983	2.95	71.70
1984	11.61	80.63
1985	21.07	82.55
1986	29.24	90.30
1987	31.41	90.91

Source: HCFA 2082 Medicaid data.

Note: Recipients for states with two reimbursement systems are included under the reimbursement system type which covers the majority of the expenditures.

Appendix B

Table B.1

Expenditures and Recipients for Selected
Medicaid Program Outcomes, 1980-1987

Year	Expenditures		Recipients	
	Billions of $	Percent Change	Millions	Percent Change
		Total		
1980	23.3		21.6	
1981	27.2	16.7	22.0	1.7
1982	29.4	8.1	21.6	-1.7
1983	32.4	10.2	21.6	- .2
1984	33.9	4.6	21.6	.3
1985	37.5	10.7	21.8	1.0
1986	41.0	9.3	22.5	3.2
1987	45.2	10.2	23.2	3.0
		Aged*		
1980	8.7		3.4	
1981	9.9	13.6	3.4	-2.1
1982	10.7	8.2	3.2	-3.8
1983	12.0	11.3	3.4	4.1
1984	12.8	7.2	3.2	-4.0
1985	14.1	10.0	3.1	-5.5
1986	15.1	7.1	3.1	2.6
1987	16.1	6.9	3.3	3.8
		Inpatient Hospital		
1980	6.4		3.7	
1981	7.2	12.2	3.7	.6
1982	7.7	6.6	3.5	-4.7
1983	8.8	14.9	3.7	4.7
1984	8.8	.4	3.5	-6.2
1985	9.5	6.8	3.1	-11.7
1986	10.4	9.6	3.5	15.8
1987	11.3	9.0	3.3	-8.0

Source: HCFA 2082 Medicaid data.

* Aged recipients are those whose eligibility status is age 65 and older; they do not include blind and disabled recipients age 65 and older.

Table B.2

Medicaid Expenditures Per Recipient, 1980-1987

Year	All Recipients		Aged*	
	Expenditures ($)	Percent Change	Expenditures ($)	Percent Change
1980	1,079		2,540	
1981	1,238	14.7	2,948	16.1
1982	1,361	10.0	3,315	12.4
1983	1,503	10.4	3,545	7.0
1984	1,569	4.4	3,957	11.6
1985	1,719	9.6	4,605	16.4
1986	1,821	5.9	4,808	4.4
1987	1,948	7.0	4,950	3.0

Source: HCFA 2082 Medicaid data.

* Aged expenditures per recipient are for those whose eligibility status is age 65 and older; they do not include expenditures for blind and disabled recipients age 65 and older.

Table B.3

Medicaid Expenditures per Recipient,
by Type of Service and Recipient, 1980-1986

Year	Aged*		Non-Aged	
	Expenditures ($)	Percent Change	Expenditures ($)	Percent Change
		Inpatient Hospital		
1980	299		296	
1981	333	11.4	326	10.1
1982	403	21.2	346	6.2
1983	539	33.5	385	11.1
1984	515	- 4.4	391	1.6
1985	571	10.8	411	5.1
1986	620	8.7	435	5.8
		Nursing Home		
1980	1,949		175	
1981	2,172	11.4	227	30.1
1982	2,513	15.7	258	13.4
1983	2,554	1.6	301	16.8
1984	2,792	9.3	318	5.9
1985	3,265	17.0	337	5.9
1986	3,333	2.1	364	8.0
		Outpatient Hospital		
1980	23		56	
1981	31	38.4	70	24.3
1982	43	38.4	71	.9
1983	44	.5	78	11.1
1984	43	- 2.3	82	4.6
1985	44	4.0	88	7.4
1986	53	18.6	94	6.4
		Home Health		
1980	64		6	
1981	84	32.1	8	24.9
1982	103	22.4	9	13.5
1983	119	15.4	11	22.7
1984	149	25.3	16	46.8
1985	226	51.7	23	43.9
1986	273	20.6	26	12.3

Source: HCFA 2082 Medicaid data.

* Aged expenditures per recipient are defined as all Medicaid expenditures for those who are 65 years old and older (including aged blind and disabled recipients) divided by the number of recipients whose eligibility status is age 65 and older (not including aged blind and disabled recipients).

Appendix C

Table C.1

State Groupings

Retrospective (10)

DE
IN
NH
ND
WV
WY
CT
ID
LA
DC

Retro-to-PRO (20)

AL	MS
AK	MO
AR	NM
FL	CA
GA	NE
HI	NC
NV	OK
IL	TN
KS	VT
KY	VA

Retro-to-DRG (7)	Retro-to-DRG '86	Retro-to-DRG '87
OH	SC	MT
PA	TX	IA
SD		
UT		
WA		
OR		
MN		

Table C.2

Hospital Expenditures Per Recipient
By State System Type

Year	Retrospective	Retro-to-PRO	Retro-to-DRG		
			'83-'85	'86	'87
		Dollars			
1980	308	276	293		
1981	314	314	299		
1982	381	333	368		
1983	423	377	396		
1984	471	380	387		
1985	484	419	397	334	
1986	497	424	426	395	366
1987	533	450	441	392	398
		Percent Change			
1980	-	-	-		
1981	1.9	13.8	2.0		
1982	21.3	6.1	23.1		
1983	11.0	13.2	7.6		
1984	11.3	.8	- 2.3		
1985	2.8	10.3	2.6	-	
1986	2.7	1.2	7.3	18.7	-
1987	7.2	6.1	3.5	- .8	8.7

Table C.3

Total Expenditures Per Recipient
By State System Type

Year	Retrospective	Retro-to-PRO	Retro-to-DRG '83-'85	Retro-to-DRG '86	Retro-to-DRG '87
		Dollars			
1980	1,235	920	1,041		
1981	1,310	1,046	1,296		
1982	1,571	1,118	1,586		
1983	1,826	1,231	1,687		
1984	2,002	1,275	1,745		
1985	2,105	1,428	1,829	1,716	
1986	2,249	1,500	1,970	1,772	1,774
1987	2,464	1,584	2,101	1,747	1,874
		Percent Change			
1980	-	-	-		
1981	6.1	13.7	24.5		
1982	19.9	6.9	22.4		
1983	16.2	10.1	6.4		
1984	9.6	3.6	3.4		
1985	5.1	12.0	4.8	-	
1986	6.8	5.0	7.7	3.3	-
1987	9.6	5.6	6.6	- 1.4	5.6

Table C.4

Hospital Expenditures Per
Day of Covered Care

Year	Retrospective	Retro-to-Pro	Retro-to-DRG
		Dollars	
1984	395	516	377
1985	410	488	425
1986	490	451	422
		Percent Change	
1984	-	-	-
1985	3.8	- 5.4	12.7
1986	19.5	- 7.6	- 0.7

HMO ENROLLMENT

AGGREGATE DEMAND

MEDICAID PHC USE

CROSSOVER USE AND SPENDING

THE IMPACT OF MEDICARE PROSPECTIVE PAYMENT ON MEDICAID-FUNDED POST-HOSPITAL CARE

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EXECUTIVE SUMMARY

THE IMPACT OF MEDICARE PROSPECTIVE PAYMENT ON MEDICAID-FUNDED POST-HOSPITAL CARE

Concern has risen that Medicare's Prospective Payment System (PPS) of reimbursement for inpatient hospital care of the aged and disabled may be causing hospitals to discharge patients "quicker and sicker." If so, one might expect a rise in post-hospital utilization of health care, particularly inpatient readmissions and first-time nursing home admissions. In this study, data on inpatient episodes among all persons eligible for both Medicare and Medicaid ("crossover" recipients) in California and Michigan from 1981 through 1984 were derived from the U.S. Health Care Financing Administration's "Tape-to-Tape" data base of uniform Medicaid claims and enrollment. Each episode included a 60-day aftercare period and a 180-day precare period. This report focuses only on the aftercare period. Measures include the probability and level of use and amount of Medicaid payment for inpatient, outpatient, prescription drug, nursing home, and home health care. For all of these measures, the analysis uses both annual sums and sums for the pre-PPS and post-PPS periods, defined on the basis of hospital-specific implementation of PPS.

Rather than increasing, Medicaid-funded post-hospital utilization and expenditures unexpectedly declined over time in both states. In Michigan, the typical pattern was a gradual increase from 1981 through 1983, followed by a sharp dropoff in 1984. The major exceptions to this pattern occurred in certain outpatient, prescription drug, and Skilled Nursing Facility (SNF) measures, all of which rose throughout the period to their highest levels in 1984. In California, most of the measures declined throughout the period, or at least from 1982, although the one measure that followed the Michigan

pattern by peaking in 1983 was a significant one: inpatient hospital expenditures. These overall patterns generally persisted when the total population of episodes was broken down into various subpopulations on the basis of nursing home residence, age, and diagnosis.

Also evident were a substantial decline in the average length of an inpatient stay in the aftercare period; a discernible increase in surgical complications, especially those diagnosed in an inpatient setting; and a slight shift toward later inpatient readmissions in Michigan but not California. The results also follow previous studies in showing California (the Western region) to have much lower levels of health-care utilization and expenditure than Michigan (the North Central region). Finally, the rate of inpatient admissions per 1,000 enrollees declines in 1984 in both states; but the dropoff in Michigan is much larger than in California, particularly among crossovers. This probably reflects a combined effect of Medicare PPS in conjunction with anticipatory behavior among providers facing certain major cost-containment initiatives in Michigan's own Medicaid program.

The results clearly contradict the "quicker and sicker" hypothesis in demonstrating that Medicaid-funded aftercare utilization declined rather than increased following implementation of Medicare PPS. They also cast doubt on the contention that the cost of providing aftercare has been shifting from Medicare to Medicaid in the post-PPS era. One interpretation is that, under PPS, crossover patients are increasingly being steered away from institutional aftercare and are being treated more often in outpatient settings and with more prescription drugs. Depending on one's perspective, this could mean either that inappropriate use of institutional care is being reduced, or that crossover patients are increasingly being denied access to needed institutional care. Further research is clearly needed on this important issue.

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THE IMPACT OF MEDICARE PROSPECTIVE PAYMENT ON MEDICAID-FUNDED POST-HOSPITAL CARE

Background

Since the implementation of Medicare's prospective payment system (PPS) for inpatient hospital care beginning in October of 1983, considerable speculation and anecdotal evidence have been offered in support of the contention that Medicare patients are being discharged "quicker and sicker" and often are not receiving adequate post-hospital care. Systematic data concerning this potentially serious problem have been scarce, however, and efforts to collect such data or to uncover relevant patterns in existing data have only recently begun. Unfortunately, despite the urgent need for informed decision-making concerning this problem, most such research efforts will require considerable time and resources before they can produce information that can be used in the policy process.

One valuable source of data does exist, however, that can yield such policy-relevant information for a relatively small amount of time and resources: the set of uniform state Medicaid data known as "Tape-to-Tape," developed by SysteMetrics/McGraw-Hill, Inc., for the U.S. Health Care Financing Administration (HCFA). It contains data for all Medicaid enrollees beginning in 1980 in five states: California, Georgia, Michigan, New York, and Tennessee. Compiled into a uniform format from Medicaid claims, enrollment, and provider files furnished by the states themselves, the Tape-to-Tape data contain extensive information on utilization, expenditures, diagnoses, and procedures for a wide variety of health services. Also included are the specific dates on which those services were rendered, plus characteristics of both the recipients and the providers of those services.

The Tape-to-Tape data base is particularly useful for this analysis because it includes the impoverished elderly and disabled who are eligible for Medicaid as well as Medicare, a highly vulnerable portion of the Medicare population. According to unpublished HCFA data, these "dual enrollees" or "crossovers" represent about 22 percent of Medicaid enrollees and about 14 percent of Medicare enrollees. By virtue of their higher age levels and poorer health status, they consume a disproportionate share of health care covered by Medicare. Moreover, Medicaid recipients (largely crossovers) consume about 45 percent of all long-term care (nursing home and home health), of which only a small part is covered by Medicare. Finally, Medicaid also covers most of the considerable use of prescription drugs by crossovers.

Before discussing how this valuable resource is utilized in this study, let us first review two highly relevant bodies of literature: studies relating to the effects of prospective payment systems, particularly Medicare's; and studies of the outcomes of hospital care, particularly surgery.

Previous Studies of Hospital Outcomes

Mortality. Not surprisingly, the concept of health-care "outcomes" is usually operationalized as the occurrence of events that signal adverse consequences for the patient. Few would disagree that the most serious adverse outcome of health care is mortality, which has thus been the usual focus of previous outcome-oriented studies. Most such studies (Luft, Bunker, and Enthoven, 1979; Luft, 1980; Shortell and LoGerfo, 1981; Flood, Scott, and Ewy, 1984a and 1984b; Maerki, Luft, and Hunt, 1986; Sloan, Perrin, and Valvona, 1986; Kelly and Hellinger, 1986; Blumberg, 1986) have confined that focus to deaths that occur during hospitalization -- a limitation arising more from reliance on hospital discharge abstract data than from sound theoretical reasoning. However, some early studies of hospital-related mortality (Brook et al., 1971; Stanford, 1976; Flood et al., 1982) employed follow-up assessment and interviews to measure mortality up to six months after discharge. More recently, Medicare claims and enrollment data have been used to link information on hospital care and subsequent death up to one year following surgery (Lubitz, Riley, and Newton, 1985; Riley and Lubitz, 1985).

Most of these studies have concentrated on the inverse relationship at the hospital level between mortality (number of deaths) and surgical volume (number of surgical procedures). All have demonstrated that, for most surgical procedures, mortality is lower for hospitals that perform more surgery, either of the specific type being studied or overall. The direction of causality underlying this relationship remains unclear, however. It could be that hospitals performing more surgery gain experience that reduces mortality, or that hospitals with lower death rates attract more referrals for surgery. Furthermore, the evidence for such a relationship at the physician level is more mixed (Shortell and LoGerfo, 1981; Flood et al., 1982).

Regardless, the evidence of the relationship at the hospital level appears strong enough to prompt most analysts to advocate regionalization of surgery for certain procedures. Nevertheless, a more recent study (Maerki, Luft, and Hunt, 1986) points out the need for emergency treatment in small-volume hospitals, given their distance from designated regional specialty hospitals. It also questions the capacity of some designated regional hospitals to handle a larger patient load. Another recent study (Sloan, Perrin, and Valvona, 1986) found variation in mortality to be more procedure-related than volume-related and concluded that "an adequate statistical basis for setting minimum volume standards does not presently exist" (p. 446). These two studies appear to corroborate Donabedian's (1984) call for further research on the nature of the association between outcome and organizational characteristics before regionalization of surgery is uncritically adopted.

A related area in the literature on hospital outcomes has focused on the survival rate of patients receiving intensive care, specifically its inverse relationship to the cost of such care (i.e., the positive association between mortality and cost). That is, patients consuming the most resources tend to have the lowest survival rate (i.e., the highest death rate). A more refined analysis that employed measures of extent of therapy and severity of illness (Scheffler et al., 1982) found that the relationship is actually U-shaped. That is, as the extent of therapy increases, the probability of death initially declines, then levels off, and finally increases rapidly. Again the dependent variable has usually been death in the hospital (Civetta, 1973; Turnbull et al., 1979; Sheffler et al., 1982), but a few studies have used follow-up assessment and interviews to capture post-hospital mortality as well (Cullen et al., 1976; Chassin, 1982).

Another related area involves the nature of catastrophic illness and the characteristics of high-cost patients, including their mortality rates. These studies have further demonstrated the direct relationship between probability of death and amount of health-care resources consumed, which stems from the fact that patients requiring more services tend to be older and more often near death. (They are also presumably "sicker," but no consensus has yet been achieved on how best to measure initial severity of patient case mix.) Again, the focus has usually been confined to death in the hospital (Schroeder, Showstack, and Roberts, 1979; Zook and Moore, 1980), but one study matched patient records to death records to obtain rates of post-hospital mortality (Schroeder, Showstack, and Schwartz, 1981). These studies have been conducted with an eye toward development of catastrophic insurance, especially for Medicare recipients. They also imply that improved methods of diagnosing terminal illness need to be developed so that appropriate forms of palliative care (esp. hospice) can be encouraged and scarce acute-care resources redirected to patients with better prognoses.

Non-Mortality Outcome Measures. Although mortality may be the principal outcome of hospital care, it is by no means the sole indicator of the quality of that care (Kelly and Hellinger, 1986: 799). Most importantly, patients who survive hospitalization vary in their degree of morbidity (extent of illness). A few of the studies of post-hospital mortality (Brook et al., 1971; Stanford, 1976; Flood et al., 1982) have also used follow-up interviews to assess the patient's health and functioning for up to six months after discharge. A similar approach has been employed in randomized trials designed to assess the efficacy of specific surgical procedures, such as tonsillectomy (Paradise et al., 1984), and was recently used to analyze outcomes among patients with chronic obstructive pulmonary disease (Strauss et al., 1986).

A less direct but still valid approach to measuring morbidity has been to use claims data to indicate the patient's extent of utilization of health care following hospitalization. As with morbidity, this approach has been employed to supplement analyses of post-hospital mortality (Chassin, 1982) and to assess the efficacy of various surgical procedures (Roos and Roos, 1983), including tonsillectomy (Roos, Roos, and Henteleff, 1978). More recently it has been used to compare outcomes among patients of family physicians and internists (Franks and Dickinson, 1986). A related area of the literature has focused on the "offset effect" of treatment for mental health (Mumford, et al., 1984; Borus, et al., 1985) and alcoholism (Holder and Blose, 1986) in reducing health care utilization and expenditures.

One specific form of utilization following an initial hospital stay has received special attention in the literature, namely hospital readmission. Hospital recidivism has been shown to vary greatly among the states (Gornick, 1977) and to be a major factor behind high-cost use (Anderson and Knickman, 1984). In particular, readmission for the same disease accounts for nearly 60 percent of all hospital charges (Zook, Savickis, and Moore, 1980: 460). Analysis of Medicare data reveals that ". . . expenditures are highly concentrated on a small percentage of beneficiaries who are repeatedly admitted to the hospital . . . [and] that a high percentage of Medicare hospitalizations are followed by readmissions within short periods of time" (Anderson and Steinberg, 1984: 1351-2). Predictors of repeat hospitalization include diagnosis (severe, chronic illnesses, esp. those requiring life- maintenance therapy), absence of surgery, dependence (esp. widowhood), low levels of life satisfaction, harmful personal habits (e.g., substance abuse), and being eligible for Medicaid (Zook, Savickis, and Moore, 1980; Anderson and Steinberg, 1985; Fethke, Smith, and Johnson, 1986). On the other hand, a recent study

of a sample of elderly patients in Wales asserts that most rehospitalizations are due not to social factors, but to relapse in the patient's original medical condition (Victor and Vetter, 1985).

Another non-mortality measure of hospital outcomes has been the rate of occurrence of surgical complications. Like mortality, the incidence of post-operative wound infection has been shown to be inversely related to surgical volume (Farber, Kaiser, and Wenzel, 1981). Frequency of complications has also been used to characterize high-cost users (Zook and Moore, 1980) and, along with post-hospital utilization, to assess the efficacy of specific surgical procedures. Paradise et al. (1984) employed direct clinical assessment to measure the occurrence of complications following tonsillectomy, and Roos et al. (1985, 1986) have demonstrated that diagnosis codes in computerized claims records can be used to measure, for a variety of surgical procedures, the incidence of complications associated with readmission to the hospital.

This study uses a similar method to measure post-surgical complications in outpatient as well as inpatient settings, plus standard measures of hospital readmissions and other forms of post-hospital utilization and expenditure, among Medicaid recipients in Michigan and California from 1981 through 1984 to compare patterns of post-hospital care before and after implementation of Medicare's prospective payment system. These methods are discussed in depth in a later section.

Previous Studies of PPS Impacts on Post-Hospital Care

DRG-based prospective reimbursement for inpatient hospital care is a rather recent innovation. It was initially developed in the mid-1970s as a method of grouping large numbers of cases to establish norms for inpatient length of stay, to be used by Professional Standard Review Organizations (PSROs) in their surveillance of Medicare utilization (Vladeck, 1984: 577). The first operational DRG-based reimbursement system was enacted in 1980 by the state of New Jersey, which was one of a handful of states that had previously adopted prospective, per-diem rate-setting for all hospitals, although New Jersey's system regulated only Blue Cross payments. The state's move to a DRG-based system for all payers was fostered by HCFA's willingness to waive Medicare and Medicaid requirements in order to experiment with per-case reimbursement (Hsiao et al., 1986: 33-34). Federal officials were interested in adopting a similar system for Medicare patients using a new set of DRGs being developed by researchers at Yale University (Fetter et al., 1980). Such a system was enacted by Congress as part of the Social Security Amendments of 1983 and was implemented beginning in October of that year.

Although much has been written about prospective payment mechanisms and case-mix measurement, very few empirical assessments of the impacts of DRG-based reimbursement have actually been published, simply because it is such a recent development. Because it was implemented earlier than Medicare PPS, New Jersey's DRG-based system has received more thorough scrutiny. Hsaio et al. (1986) examined American Hospital Association data on New Jersey hospitals from 1971 to 1983 and concluded that the strongest impact of the new system stemmed from provisions for reimbursement of bad debt and charity care rather than moderation of hospital cost inflation. Reimbursement for uncompensated care apparently helped those hospitals in worst financial condition

and improved access for the state's uninsured population. Hospital costs per case declined sharply due to reduction in average length of stay, but this was insufficient to offset a concomitant rise in admission rates. Overall growth in hospital expenditures was actually not much less than it had been under prospective, per-diem rate-setting.

In addition to numerous articles that speculate, without benefit of data, about the likely impacts of per-case reimbursement (esp. incentives for earlier discharge, reduced ancillary services, and increased admission rates), a few studies have employed DRG-grouped patient data to explore empirical patterns likely to emerge. Pokras (1984), for example, used National Hospital Discharge Survey data to estimate the frequency and length of stay of DRGs by age, sex, and region. Meiners and Coffey (1985) used discharge abstract data for patients in Maryland hospitals in 1980, plus nursing home records on patients admitted from short-stay hospitals in 1980 through 1982 in San Diego, to identify those DRGs most likely to require aftercare and to describe the characteristics of hospital patients most likely to face pressure for early discharge.

As might be expected, numerous studies have been undertaken since enactment of Medicare PPS, all designed to evaluate its effects on various aspects of the U.S. health care system (Gaumer and Cowen, 1986). However, only a few of these studies have been completed to date, and many of those have employed less formal methods (esp. small-scale surveys) in order to obtain quick results. Nonetheless, those studies generally support the hypothesized effects of PPS. In terms of impacts on hospitals, PPS appears to be reducing the use of ancillary services (e.g., laboratory tests), thereby depressing the labor markets in those fields, while at the same time boosting activity in the fields of discharge planning, medical record review, and data processing.

In terms of impacts on patients, PPS appears to be increasing the demand for post-hospital services (social as well as health, particularly technically skilled care), thereby placing severe burdens on nursing homes, home health agencies, and informal caregivers. Moreover, due to an inadequate supply of aftercare services in some locales and for certain types of patients, the proportion of hospital patients awaiting aftercare placement appears to be increasing, creating the potential for lower quality of care both in the hospital and in aftercare settings (Gaumer and Cowen, 1986: 16-20).

The most comprehensive analysis of the impact of Medicare PPS published to date was based on limited data available from the Medicare Statistical System (Guterman and Dobson, 1986). As expected, inpatient average length of stay for Medicare beneficiaries dropped much faster in 1984 than in it had over the previous 15 years. However, unlike in New Jersey, the expected increase in the Medicare inpatient admission rate, with hospitals trying to offset the decline in length of stay, failed to materialize in 1984. Rather, Medicare admissions actually decreased for the first time in 15 years, combining with the falling length of stay to depress hospital occupancy rates. Hospitals have responded by cutting staff levels and other costs, so that most have experienced sharp increases in profits. The exceptions have tended to be small, rural facilities unable to cut budgets further and urban public hospitals that treat a disproportionate share of uninsured patients. PPS also appears to have moderated the growth in Medicare outlays, except for home health care, which has continued to expand rapidly.

In the absence of reliable evidence on the impact of PPS on post-hospital care, this study will concentrate on expected patterns derived from the "quicker and sicker" hypothesis. Those expectations will be spelled out in a later section.

Guterman and Dobson (1986) further report that other payers, including Medicaid and Blue Cross/Blue Shield, have also experienced declines in admissions and length of stay. As for the impact of PPS on non-hospital providers, physicians have apparently cooperated with hospitals in reducing length of stay, ordering fewer ancillary services, and shifting care (including surgery and diagnostic testing) to outpatient settings where possible. Preliminary evidence also suggests an increase in Medicare-covered nursing home and home health use, and no evidence has substantiated a decrease in quality or access to care. Indeed, Guterman and Dobson (1986: 108) argue that quality of care can be expected to improve under PPS due to better patient management, increased specialization of services, elimination of unnecessary services, and reduction of iatrogenic outcomes arising from excessively long hospital stays. They conclude that PPS appears to be "accomplishing many of its stated objectives, without any major problems thus far" (Guterman and Dobson, 1986: 113).

Although this conclusion appears to conflict with those of other recent studies reported in Gaumer and Cowen (1986), the issue is not whether PPS can be expected to encourage a shift of some services, including diagnostic testing, some forms of surgery, and recuperation, from an inpatient setting to an outpatient setting, for that is clearly one of its major goals. Rather, the issue is whether this is being done without regard to the extent of non-hospital care available to Medicare patients, and whether it is creating such an intolerable burden on non-hospital providers that the quality of the care they provide is suffering.

Methodology

Time Periods and States. Assessing the impacts of PPS requires, at minimum, the use of data on health care utilization and expenditures for the periods before and after the implementation of that system. Those effects would be manifested in terms of changes in the patterns of inpatient and post-hospital care following that implementation. Such changes would appear most clearly in the form of abrupt shifts in trends, established by more than one observation prior to PPS, in such measures as the number of nursing home days per 1000 enrollees. Of course, the absence of a control group of patients not exposed to changes in provider behavior following PPS limits the extent of causal inference about the true effects of that policy change.

Similarly, the lack of available data for a sufficient number of time points following PPS severely limits the reliability of the more sophisticated forms of interrupted time-series analysis that could be used. Although implementation of PPS was formally initiated on October 1, 1983, hospitals were brought under the system in stages according to their fiscal years:

Hospital Fiscal Year	Date Brought under PPS	Percent of Hospitals
October 1 - September 30	October 1, 1983	15%
Janurary 1 - December 31	January 1, 1984	20
July 1 - June 30	July 1, 1984	25
Other	Varied between 10/83 and 7/84	40

Moreover, beyond these beginning dates, implementation of PPS is being phased in only gradually over several years (recently postponed by Congress), with the basis for reimbursement shifting from 75 percent hospital-specific retrospective costs in Federal Fiscal Year 1984 to 100 percent PPS in FFY 1988. For this study, the Tape-to-Tape data had been processed only through calendar year 1984, and then only for some states. Even in the last quarter of that year, reimbursement was based only 50 percent on national and regional average

costs. Thus, no hospitals were operating completely under PPS, even at the end of the period covered by this study.

Nevertheless, partial implementation of PPS, coupled with a known advance schedule for full implementation, can still be expected to have significantly influenced provider behavior. Indeed, a case can be made for treating the period between congressional passage of PPS (April 1983) and its actual implementation (October 1983) as a transition period during which hospitals may have altered their behavior in anticipation of the actual change in reimbursement. In addition, the months between October 1, 1983, and July 1, 1984, when all hospitals were partially brought under PPS, can be treated as another transition period. Otherwise, even aggregating the claims data to the month level leaves only six months following "final" implementation of PPS (July 1, 1984), a sparse number of time points for statistical analysis.

An alternative approach, employed in this study, was to use hospital-specific dates of PPS implementation, available from HCFA-supplied data. The demarcation of the post-PPS period from the pre-PPS period could then be made claim-specific. That is, each claim was tagged as being either pre- or post-PPS according to whether its admission date fell before or after the date on which the specific hospital involved in that claim was brought under PPS. As will be documented later, a certain number of claims had to be discarded, either because there was no date of PPS implementation available for them (e.g., hospitals exempt from PPS) or because identifier discrepancies (i.e., different units within one hospital, name or address variations, etc.) could not be resolved. Another unfortunate feature of the file containing hospital-specific dates of PPS implementation was that it contained no other provider characteristics useful for analysis.

Despite these shortcomings, this approach permitted comparisons of the pre-PPS and post-PPS periods to be based on actual (though still partial)

implementation of PPS, rather than on a single arbitrary date for all hospitals. Still, annual data (i.e., comparison of 1984 to earlier years) were also used in this study to identify any obvious changes in health-care patterns from one broad period to another.

Of the five states in the Tape-to-Tape data base, only California and Michigan have complete data on crossovers for a sufficient period of time both before and after implementation of PPS. Both states are used in this analysis in order to cross-validate any observed changes that might be associated with PPS. 1980 could not be used due to missing nursing home claims in Michigan for that year. The study therefore uses data for 1981 through 1984.

Variables and Population. The focus of this study is on post-hospital care, particularly hospital readmission and long-term care, measured by standard indicators of utilization (see Figure 1), plus counts of surgical complications (see Figure 2). Such indicators are used to measure all types of health services except dental care: inpatient, outpatient, nursing home, home health, and prescription drug. Diagnosis (hence complications) is available only for the first three categories of service, and reliable information on death is not available at all for either state. Expenditures are measured as Medicaid amount paid (all claims with zero Medicaid amount paid were excluded), deflated to 1981 dollars using the price indexes given in Figure 3. Payment amounts on a given claim were deflated using the appropriate price index figure for the month in which the claim occurred (or ended, for hospital and nursing home claims). The market basket indexes were available only on a quarterly basis, so monthly figures were interpolated.

Figure 1

Variables used in the study of PPS impact on Medicaid-funded aftercare

FOR EACH KEY-STAY EPISODE (includes 180 days of precare preceding admission and 60 days of aftercare beginning at discharge):

Utilization and expenditure measures:[1]

Total number of:

- Inpatient hospital stays (discharges for precare period, admissions for aftercare period)
- Inpatient hospital days (based on admission and discharge dates)
- Inpatient hospital stays (see above) in which surgery occurred (Michigan only)[2]
- Outpatient visits (Michigan only)[3]
- Nursing home days[4]
- Home health visits
- Drug prescriptions

Total amount of expenditure (Medicaid payment, deflated to 1981 dollars) for each of the following types of service:

- Inpatient hospital care (facility)
- Physician inpatient care[3]
- Outpatient care[3]
- Nursing home care[4]
- Home health care
- Prescription drugs
- All services combined

(continued)

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1 These measures include one set for the precare period and one set for the aftercare period, the latter broken down by month. Patients with any occurrence of mental health or mental retardation categories of service are excluded from the analysis.

2 Occurrence of surgery is indicated by presence of an ICD-9-CM procedure code appearing on the DRG procedure list. Due to its lack of procedure codes, this measure is not available for California.

3 Data on physician (and other practitioner) services, regardless of place of service, are drawn from the "outpatient" claims file. Such services rendered during an inpatient hospital stay are separated out by matching "outpatient" dates of service with inpatient admission and discharge dates. All other physician (and other practitioner) services (including those rendered in a nursing home) are here termed "outpatient." Due to span billing (see text), visit counts are not possible for California.

4 For Michigan but not California (see text), the nursing home measures are broken down into SNF, ICF, and total.

(Figure 1, continued)

Other attributes of the key-stay episode:

Total number of inpatient hospital admissions occurring on day of key discharge and within 7, 14, 30, and 60 days following key discharge
Total number of nursing home admissions occurring on day of key discharge and within 7, 14, 30, and 60 days following key discharge
Whether or not the patient was a resident of a nursing home at time of admission to the key hospital stay (one-day lag permitted)
Number of surgical complications (see Figure 2) occurring in the after-care period, broken down by setting (inpatient, outpatient, LTC)

Attributes of the key hospital stay:

Length of stay, in days
Total amount of expenditure (Medicaid payment, in 1981 dollars)
Principal diagnosis
Secondary diagnosis
Principal surgical procedure (Michigan only)
Number of surgical complications (see Figure 2)
Hospital date of PPS implementation (used to demarcate pre/post-PPS periods)

Patient characteristics:[1]

Age: Under 65, 65 to 74, 75 to 84, 85 and over
Sex: Male, female
Eligibility: Aged, Blind/Disabled
Race: White, nonwhite (Michigan only)

(continued)

1 Patient characteristics are taken from the enrollment record closest to time of discharge from the key hospital stay. Where missing, the patient's other enrollment records for all four years were searched. Discrepancies over time were resolved by taking the most frequent category.

(Figure 1, continued)

AGGREGATE MEASURES (computed from the above discharge-level measures):[1]

Probability of use (i.e., proportion of episodes using) each type of service (see first page of figure)
Average number per episode (or per 1000 episodes) of each type of service used (days, visits, etc.)
Average amount of expenditure (Medicaid payment, deflated to 1981 dollars) per episode, for each type of service used
SNF percentage of total nursing home days (Michigan only)
Inpatient average length of stay, in days
Percentage of episodes with an inpatient hospital admission occurring on day of key discharge and within 7, 14, 30, and 60 days (cumulative) following discharge
Percentage of aftercare-period inpatient hospital admissions occurring on day of key discharge and within 7, 14, and 30 days (cumulative) following discharge
Percentage of episodes with a nursing home admissions occurring on day of key discharge and within 7, 14, 30, and 60 days (cumulative) following discharge
Percentage of aftercare-period nursing home admissions occurring on day of key discharge and within 7, 14, and 30 days (cumulative) following discharge
Percentage of key stays in which the patient was a resident of a nursing home at time of admission to the key hospital stay (one-day lag permitted)
Average number of surgical complications (see Figure 2) per 1000 episodes occurring after key-stay admission, broken down by setting (inpatient, outpatient, and LTC)

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1 The measures for the precare period, the key hospital stay, and the patient's characteristics are used as predictor and control variables. Depending on the measure, the key hospital stay is included in the precare period (e.g., prior expenditures), the aftercare period (e.g., number of complications), or the entire episode (e.g., average length of stay), and is also treated separately (e.g., diagnosis).

Figure 2

Selected diagnoses and surgical complications: ICD-9-CM codes

Diagnoses	ICD-9-CM codes
1. Stroke (cerebrovascular disease)	433, 434, 436
2. Pneumonia	480-486
3. Total hip replacement	Procedure 81.5
4. Inguinal hernia repair	Procedure 53.0
5. Congestive heart failure	428
6. Acute myocardial infarction	410
7. Transurethral prostatectomy	Procedure 60.2
8. Chronic pulmonary heart disease	416
9. Lens extraction	Proc. 13.1-13.5

Surgical complications [1]

ICD-9-CM Code	Complication
349.0	Reaction to spinal or lumbar puncture
349.1	Nervous system complications from surgically implanted device
383.3	Complications following postmastoidectomy
429.4	Functional disturbance following cardiac surgery
457.0	Postmastectomy lympheda syndrome
518.4	Pulmonary edema (incl. postoperative)
518.5	Pulmonary insufficiency (including following surgery)
519.0	Tracheostomy complication
551.21	Incisional ventral hernia with gangrene
552.21	Incisional ventral hernia with obstruction
553.21	Incisional ventral hernia, no gangrene or obstruction
564.2	Postgastric surgery syndromes
564.3	Vomiting following gastrointestinal surgery
564.4	Diarrhea following gastrointestinal surgery
569.6	Colostomy and enterostomy malfunction
576.0	Postcholecystectomy syndrome
579.2	Postoperative blind loop syndrome
579.3	Other and unspecified postsurgical nonabsorption
593.3	Stricture or kinking of ureter (including postoperative)
598.2	Postoperative urethral stricture
618.5	Prolapse of vaginal vault after hysterectomy
620.6	Broad ligament laceration syndrome
623.2	Stricture or atresia of vagina (including postoperative adhesions)
737.12	Kyphosis, postlaminectomy
737.21	Lordosis, postlaminectomy
995.2	Unspecified adverse effect of drug, etc.
995.4	Shock due to anesthesia
996.xx	Complications peculiar to certain specific procedures

(continued)

[1] These complication codes can be either the principal or secondary diagnosis on a claim. The list excludes complications of labor and delivery.

(Figure 2, continued)

997 -- Complications affecting specified body systems, during or resulting from a procedure, NOS:

.0	Central nervous system
.1	Cardiac
.2	Peripheral vascular
.3	Respiratory
.4	Gastrointestinal
.5	Urinary
.6	Amputation
.9	Other

998 -- Other complications of procedures, NOS:

.0	Postoperative shock
.1	Hemorrhage or hematoma complicating a procedure
.2	Accidental puncture or laceration during a procedure
.3	Disruption of operation wound
.4	Foreign body accidentally left during a procedure
.5	Postoperative infection
.6	Persistent postoperative fistula
.7	Acute reaction to foreign substance accidentally left during a procedure
.8	Other specified complications of procedures, NOS
.9	Unspecified complication of procedure, NOS

E870-E876 Misadventure to patients during surgical and medical care

E878-E879 Surgical and medical procedures as the cause of abnormal reaction of patient or later complication, without mention of misadventure at the time of procedure

Figure 3

Price indexes used to deflate Medicaid amount paid to 1981 dollars.

Price Index	Services
DRI market basket*:	
Hospital	Inpatient and outpatient hospital services; clinic services.
Skilled nursing facility	Nursing home services; inpatient psychiatric services.
Home health agency	Home health services.
Consumer Price Index, medical care portion*:	
Physician	Physician services; laboratory and X-ray services; Early and Periodic Screening services.
Prescription drug	Prescription drug services.
Other professional	Other practitioner services; other care.

* Obtained from Data Resources, Inc. (1986).

** Obtained from printout supplied by the Bureau of Labor Statistics' Consumer Prices Division. For a discussion of the medical care portion of the CPI, see Ginsburg (1978).

The unit of analysis in this study is the inpatient hospital episode of care, with the sampling unit being the inpatient discharge. Hereafter, this will be referred to as a "key stay" (rather than the more commonly used but more cumbersome term, "index hospitalization"). The episode of care surrounding each key stay includes a 180-day "precare" period (ending on the day prior to admission) and a 60-day "aftercare" period (beginning on the day of discharge). The episodes thus vary in length, but are at least 241 days long. In keeping with usual practice, length of stay is defined by discharge date minus admission date, except that stays with admission and discharge on the same day are defined as being one full day in length.

Key stays were drawn for the entire four-year period (1981 through 1984) in each state (California and Michigan), piecing together episodes which began in one year and ended in another. Unfortunately, California assigns a different Medicaid identification number whenever a recipient changes eligibility status or moves to a different county. Piecing together episodes for such recipients therefore required matching of enrollment records in terms of Social Security Number and date of birth. This was done only within each year, however, and linkage across years was based only on the occurrence of at least one common Medicaid ID number. A small number of episodes, for California recipients whose string of IDs was interrupted by a gap that spanned two years, were therefore lost to the analysis.

The study population is restricted to discharges involving crossover recipients who were continuously enrolled in Medicaid throughout the entire episode of care (from the beginning of the precare period to the end of the aftercare period). Furthermore, only discharges with Medicare involvement (i.e., claims from the Tape-to-Tape crossover inpatient files) are used as key stays, for inpatient claims covered only by Medicaid are technically not subject to PPS.

Subsequent hospital stays for the same patient that began during the aftercare period (even if they extended beyond that 60-day period) are measured as part of the aftercare utilization associated with the key stay in question. Those measures include the number of such non-key hospital stays and the number of their days that fall in the aftercare period (although their total days are used in computing average length of stay). However, those stays are excluded from the population of key stays in order to avoid double-counting their attributes.

Nursing home stays that began during the aftercare period are treated similarly: the number of nursing home admissions and the number of nursing home days falling in the aftercare period are measured as part of the aftercare utilization associated with the key stay in question. Leave days are not counted as nursing home days. Because California classifies most of its nursing homes as ICFs, even though its certification standards require them to qualify as SNFs, that distinction can be used only for Michigan. Also, due to their unique nature, mental health and mental retardation services are excluded from the analysis for both states.

Depending on the particular measure, the attributes of the key hospital stay itself (length of stay, total expenditures, etc.) are included as part of the precare period, the aftercare period, or the entire episode, but are also treated separately in some analyses. Along with the characteristics of the patient (age, sex, eligibility, and, for Michigan only, race) involved in the key stay, the utilization measures for the precare period (particularly residence in a nursing home and total expenditures) are used as predictor and control variables for analyzing the dependent-variable utilization measures for the aftercare period.

The derivation of the study population for both Michigan and California is summarized in Figure 4. Of the total population of inpatient crossover recipients (persons eligible for both Medicare and Medicaid who had at least one inpatient hospital stay) from 1981 through 1984, almost half in each state were lost to the analysis for various reasons. A substantial number of recipients had only one inpatient crossover claim that could not be picked as a key stay, either because its date of admission occurred prior to July 1, 1981 (leaving a precare period of less than 180 days) or its date of discharge occurred after November 1, 1984 (leaving an aftercare period of less than 60 days). Similarly, an even larger number of patients had to be discarded because they weren't enrolled in Medicaid for a full 180 days before or 60 days after at least one hospital stay. A few additional patients were discarded because they had no enrollment records at all or their claims contained no Medicaid amount paid. Finally, another large group of patients was deleted because they had inpatient stays that overlapped (i.e., the discharge date of the first stay was later than the admission date of the next), suggesting incorrectly recorded dates of service.

Similar overlap involving long-term care claims was permitted, however, given that reimbursement is based on the number of Medicaid-covered days (or visits for home health care) recorded on the claim. The most important example of such overlap is when Medicaid is billed for both inpatient and long-term care services for the same calendar days because the nursing home reserves a bed for the patient while s/he is in the hospital. Apparently such nursing-home days days are not always accurately reported as "leave days." In view of this uncertainty and the desire to accurately reflect all of what Medicaid actually paid for each selected episode, we chose to accept the number of Medicaid-covered days or visits and their associated dollars as

Figure 4

Derivation of the Study Population

	MICHIGAN				CALIFORNIA			
	Claims		Patients		Claims		Patients	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total inpatient crossover	130,810	100.0	64,839	100.0	724,426*	100.0	380,548*	100.0
Discarded, due to:	-54,532	-41.7	-20,709	-31.9	-251,480	-34.7	-103,271	-27.1
Admission date prior to 7/1/81	-18,327	-14.0	-6,857	10.6	-106,395	-14.7	-40,532	-10.7
Invalid date(s) of service	-0	-0.0	-0	-0.0	-30	-0.0	-14	-0.0
No enrollment records	-22	-0.0	-17	0.0	*	*	*	*
Zero amount paid	-4	-0.0	-1	0.0	*	*	*	*
Overlapping inpatient hospital claims	-304	-0.2	-73	0.1	-4,001	-0.6	-1,407	-0.4
Insufficient enrollment	-35,875	-27.4	-13,761	-21.2	-141,054	-19.4	-61,318	-16.0
Final study population	76,278	58.3	44,130	68.1	472,946	65.3	277,277	72.9

* Due to their large volume, California claims were initially screened for zero Medicaid amount paid or no associated enrollment record.

recorded rather than to discard such important cases, even if some of their calendar days were thereby double-counted.

In allocating the proportion of days, visits, and dollars falling within a given analytical period, however, we used as the denominator the total time span reported on the claim ("service to" date minus "service from" date plus one), rather than total Medicaid-covered days. This is because covered days can be less than the span (e.g., when Medicare pays part of the bill), and there is no information on which span days were covered by Medicaid. In cases where most of the span fell within the relevant analytical period, using covered days as the denominator could have resulted in proportions greater than one.

An important exception to the allocation procedure described above was required for California's physician claims. Unlike in the other Tape-to-Tape states, Medicaid outpatient claims in California are "span bills" similar to Medicare Part B claims. That is, most bills contain outpatient services rendered over a span of time rather than on a single date. This makes allocation of outpatient services (expenditures as well as visits and procedures) to time periods difficult, for it is impossible to tell which services occurred on which dates included in the time span. Proportional allocation in this case is inappropriate because outpatient services are typically spread even more irregularly throughout the time span than are institutional services.

The solution used here was to attribute the entire expenditure amount on the claim (counts of different types of visits and procedures are not available on span bills) to the period (precare, key stay, aftercare) with which it overlapped. If it overlapped the key stay as well as either the precare period or the aftercare period, the entire amount was allocated to the key

stay. Similarly, any physician claim overlapping a non-key inpatient stay was classified as inpatient physician. The assumption behind this approach is that services occurring just before or just after an inpatient stay are probably clinically related to the stay. Nevertheless, the approach probably results in an overestimate of inpatient physician expenditures and an underestimate of outpatient physician expenditures. It probably also yields an overestimate of both categories of physician expenditures in both the precare and aftercare periods. This is because claims that began before the precare period but ended during it, and claims that began during the aftercare period but ended after it, are included in their entirety, rather than being proportionally allocated as in Michigan.

Analyses. This report focuses only on the aftercare period, with two kinds of analyses conducted for each of the two states separately:

1. Annual Analysis: Descriptive analysis (tables and graphs) at the episode (discharge) level, comparing calendar-year sums (according to date of discharge) of aftercare utilization for 1984 with those for 1981 through 1983 (treated both annually and as a single period).

2. Pre/Post Analysis: Another descriptive analysis at the episode (discharge) level that compares post-PPS sums of aftercare utilization with pre-PPS sums, using hospital-specific dates of PPS implementation to demarcate the two periods (see above).

Moreover, these analyses are conducted both on the entire population of episodes and on subpopulations of episodes involving patients in specific age groups and selected diagnoses (see Figure 2). Formal tests of significance for the difference among the various periods, age groups, and diagnoses are not reported, given that the data represent the universe of selected inpatient claims in the two states rather than a random sample. Multivariate analyses (e.g., analysis of covariance) and time-series analysis of more precise periods (e.g, monthly sums) were beyond the scope of this report.

Hypotheses

All else being equal (e.g., no significant change in bed supply), the "quicker and sicker" hypothesis would anticipate higher levels of aftercare utilization in the post-PPS period (however defined) than in the pre-PPS period. More specifically, the following would be expected to characterize the post-hospital care of crossover recipients in the post-PPS period in comparison with the pre-PPS period:

1. More inpatient readmissions (admissions in the aftercare period) per 1000 recipients.
2. Earlier inpatient readmissions (e.g., a higher percentage of them occurring within one week of key discharge).
3. Shorter inpatient average length of stay (all stays).
4. Fewer inpatient days per 1000 recipients (all stays).
5. Higher rate of surgical complications (see Figure 2) per 1000 recipients (key stay and aftercare period only).
6. Higher percentage of key-stay discharges to nursing home care (based on presence/absence of claims in the aftercare period).
7. (Michigan only:) Higher percentage of SNF days (as opposed to ICF days) of nursing home care in the aftercare period.

Alternative Explanations

Several rival hypotheses unrelated to Medicare PPS must be addressed in the analysis. The early 1980s were an era of increasing concern over rising health care costs among private as well as public payers, and in state governments as well as the federal government. All sectors exerted general pressure on providers to restrain the rapid growth in the costs of health care, particularly institutional care. In the years immediately preceding PPS, the federal government imposed a variety of cost containment measures in both the Medicaid and Medicare programs, particular in various provisions of the budget reconciliation acts of 1980 and 1981 and the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982.

Most directly relevant to this study, many of those provisions gave state governments the opportunity to make changes in their Medicaid programs in the early 1980s designed to reduce unncecessary health-care utilization and to give providers incentives to become more efficient in the delivery of health care. Many of these state initiatives took effect between 1982 and 1984 -- around the time of the development, enactment, and implementation of Medicare PPS. They therefore represent potential alternative explanations for any observed changes in the patterns of post-hospital care. (The information to follow is drawn from materials assembled by SysteMetrics from a variety of sources as part of the Tape-to-Tape project.)

Michigan. The most important initiative in the Michigan Medicaid program in the early and middle 1980s was the adoption of a DRG-based prospective reimbursement system for hospitals very similar to Medicare PPS. This system was not actually implemented, however, until February of 1985 -- just after the last observations in our data. Nevertheless, the same kind of anticipatory behavior on the part of providers hypothesized to precede the formal

implementation of Medicare PPS (see above) could also have operated prior to the onset of Michigan's own system. The Michigan DRG system wasn't formally enacted until July of 1984 -- quite close to the end of our study period -- but exploration of its feasibility was mandated by legislation in 1980. That legislation itself introduced an element of prospective reimbursement into the Michigan Medicaid program by phasing in a prospective cost adjustment factor.

The likelihood of adoption of a DRG-based system became apparent in late 1983 when the official task force made its final recommendations. Providers were well aware of these events, for the state's hospital association had been heavily involved in developing the recommendation. The anticipatory impact of the Michigan DRG system may have been softened somewhat by the fact that the program initially involved separately negotiated rates designed to be budget-neutral for each hospital. Nevertheless, impending prospective reimbursement under Medicaid, on top of the already existing Medicare system, may have exacerbated any changes in the patterns of post-hospital care that might be attributed to Medicare PPS alone.

Another important initiative in Michigan also was implemented only at the very end of the period covered in this study: the Prior Authorization Case Evaluation (PACE) system in October of 1984. This system requires prior authorization for elective admissions for non-surgical as well as surgical inpatient hospital services, and represents an expansion of earlier pre-authorization requirements for elective surgeries (see below). Although it was perhaps more of an incremental expansion of policy rather than a new initiative, its timing in conjunction with the Michigan DRG reimbursement system could have magnified the anticipatory effect on the behavior of providers, discussed above.

Michigan instituted numerous other Medicaid program changes throughout the early 1980s that could have affected patterns of post-hospital care. Among the most relevant initiatives, the state:

- Adopted a mandatory Second Surgical Opinion Program (SSOP) for certain elective procedures (6/80);
- Resumed utilization review of all inpatient hospital services and instituted a preadmission screening process for certain elective procedures, and eliminated coverage of elective weekend admissions and non-emergency services delivered in an emergency room (4/82);
- Required prior authorization and periodic reauthorization for ICF care, but added coverage of personal care in homes for the aged (12/81)
- Adopted a restricted drug formulary and copayments on non-generic drugs (5/81), later extended to all prescription drugs (12/83);
- Imposed various reductions in eligibility and provider fees, copayments on outpatient hospital and physician services, and restrictions on provider practices, costs, and profits; and
- Fostered alternatives to institutional long-term care and enrollment in HMOs and ambulatory capitation and case management programs.

It would be extremely difficult, if not impossible, to isolate the impact of any one of these changes in the Michigan Medicaid program on the patterns of post-hospital care. Their overall effect, however, should be in the direction of reduced aftercare utilization and expenditures.

California. Like Michigan, California also implemented numerous changes in its "Medi-Cal" program in the early 1980s, all designed to curb the rapid growth in Medicaid expenditures. However, none had as a great a potential impact on post-hospital care as did some of the Michigan actions. Perhaps the most important initiative in California was the adoption of selective contracting with providers participating in the Medi-Cal program: for hospitals, effective July 1, 1982; and for noninsitutional providers, effective July 1, 1983. Selective contracting was also permitted between private payers and

preferred providers beginning January 1, 1983. At first glance, this program would appear to have a strong potential effect on post-hospital care, hence to serve as a major rival hypothesis to the impact of Medicare PPS. That is, by requiring Medid-Cal recipients to use only selected hospitals that essentially serve as preferred provider organizations (PPOs) for the state, aftercare utilization and expenditures for those recipients might be substantially reduced.

However, the California selective contracting system does not apply to Medicare-Medicaid crossover recipients -- the population whose hospital episodes are the focus of this study. That is, Medi-Cal recipients also covered by Medicare enjoy the latter program's freedom-of-choice provision and thus are not "locked in" to using only the selected hospitals. Aside from the generalized pressure for cost containment imposed on all providers by such a system, the aftercare utilization and expenditures of crossover recipients should not be materially affected by California's selective contracting program.

Other changes in California's Medi-Cal program, however, could have helped alter the patterns of post-hospital care. Although it has always been one of the most liberal Medicaid programs in terms of eligibility and benefits, Medi-Cal has also been one of the most restrictive in terms of provider regulation and reimbursement and one of the most aggressive in the use of utilization review. Among the most relevant changes in the early 1980s, the state:

- Adopted prospective rate adjustment for hospitals in July of 1980;
- Subjected reimbursement of the Medi-Cal portion of crossover claims to the Medi-Cal maximum, rather than the open-ended reimbursement then permitted under Medicare, beginning in October of 1981;
- Instituted copayments on some long-term care and outpatient services as well as prescription drugs in October of 1981;
- Developed HMO and primary care case management programs for its Medicaid recipients, including countywide systems in Santa Barbara and Montery, beginning in July of 1982 and June of 1983, respectively;

- o Reduced fees for a variety of health services in July of 1982;
- o Added expanded home care to its already generous list of benefits in September of 1982.
- o Began requiring prior authorization for certain elective surgical procedures in both inpatient and outpatient settings in September of 1982;
- o Implemented a volume purchasing arrangment for prescription drugs in January of 1984;

As in Michigan, disentangling the impacts of all of these Medi-Cal program changes on aftercare utilization could prove extremely difficult, if not impossible.

Interpretion. In general, results for both states showing gradual changes in aftercare utilization, rather than abrupt shifts, would suggest the piecemeal influence of these Medicaid program changes rather than the sudden impact of the enactment or implementation of any one of them -- or of Medicare PPS. Gradual change might also reflect the cumulative effects of such secular trends as the mounting general pressure for containment of health-care costs, changing practice patterns (esp. greater use of home health care), increasing severity of case mix, growing proportions of elderly and disabled patients, and changing bed supply.

The supply of nursing home beds in particular might constrain any PPS-induced changes in aftercare. If the tendency is indeed to discharge patients "quicker and sicker" from the hospital, any increase in the use of nursing homes for post-hospital care depends on the availability of unoccupied beds in those homes. If the bed supply is increasing, aftercare utilization of nursing homes could increase; but if the supply is decreasing, such utilization will probably be constrained. Unpublished HCFA data indicate that the number of nursing home beds in certified facilities (including those that are hospital-based) per 1,000 aged Medicare enrollees increased in Michigan from 49.4

in 1981 to 51.6 in 1984, but decreased in California from 47.7 to 42.8 over the same period. One might therefore hypothesize that any PPS-induced changes in post-hospital care might be weighted more heavily toward nursing home care in Michigan than in California.

The analysis must be sensitive to such conditional influences on gradual changes in the patterns of post-hospital care. Aggregation of the data by broad time periods precludes assessment of the precise timing of the effects of particular program changes. Nevertheless, the main goal of the analysis -- to ascertain whether any major shifts in the patterns of Medicaid-funded aftercare in California and Michigan occurred around the time of enactment and implementation of Medicare PPS -- can be achieved. The absence of evidence of any major impacts of PPS will be just as informative as its presence.

Findings

Inpatient Admissions. One extremely important initial finding that might at first appear to be an anomaly in the data is a large dropoff in inpatient hospital stays among Michigan crossover recipients from 1983 to 1984. Figure 5 presents the number of inpatient admissions per 1,000 person-years of enrollment among all Medicaid enrollees, broken down by crossover status, in California and Michigan in 1982, 1983, and 1984, plus the rates of change between years and across the entire period. In view of the fact that the data used in this study contain only crossover episodes, the data in Figure 5 were computed from the Tape-to-Tape "Early Returns" tables, which contain aggregate estimates for each state and year. For purposes of comparison, Figure 5 also provides similar data on inpatient admissions among Medicare enrollees (including crossovers), adapted from published HCFA data (Beebe, Lawrence, and Lintzeris, 1985: 117-118). Data for 1981 were not available on Medicaid enrollees by crossover status or on Medicare enrollees by state.

The data in Figure 5 reveal a decline in the average number of inpatient admissions among all Medicare and Medicaid enrollees in both states from 1983 to 1984; but Michigan's decrease among Medicaid enrollees, particularly crossovers, is much larger than California's. In both states, admissions among crossovers and Medicare enrollees actually increased between 1982 and 1983, as did non-crossover and total admissions in Michigan. Over the entire three-year period, crossover admissions in California and Medicare admissions in Michigan actually increased slightly; but the figures in all of the other categories declined -- again much more so in Michigan, especially among crossovers. In the Medicare program nationwide, the unexpected dropoff in inpatient admissions per 1,000 enrollees from 1983 to 1984 was slightly larger than the one observed among Medicare enrollees in these two states,

Figure 5

Inpatient admissions per 1,000 enrollees in California and Michigan, 1982-1984, by Medicare/Medicaid eligibility group

Eligibility Group	Inpatient admissions per 1,000 enrollees			Percent Change		
	1982	1983	1984	1982-1983	1983-1984	1982-1984
			CALIFORNIA			
Medicare*	350	353	343	+0.9	-2.8	-2.0
Medicaid:**						
Total	227	224	219	-1.2	-2.3	-3.4
Non-cross.	184	181	179	-1.4	-1.4	-2.8
Crossover	394	406	399	+3.2	-1.8	+1.3
			MICHIGAN			
Medicare*	385	398	387	+3.4	-2.8	+0.5
Medicaid:**						
Total	205	209	188	+1.9	-10.2	-8.4
Non-cross.	181	185	170	+2.4	-8.3	-6.0
Crossover	489	495	399	+1.2	-19.3	-18.4

* Includes crossovers. Source: Beebe, Lawrence, and Lintzeris (1985: 117-118).

** Admissions per 1,000 person-years of enrollment. Source: HCFA "Tape-to-Tape" data base (uniform state Medicaid data), "Early Returns" Tables E-2-A-1 and S-4-G-1.

but still much smaller than the decrease found among Medicaid enrollees in Michigan: a 3.5 percent decline, following small increases over the previous two years (Guterman and Dobson, 1986: 103).

All potential explanations for the sharp dropoff in hospital stays in the Michigan Medicaid program have been explored with the Tape-to-Tape project staff and Michigan state officials. No data processing errors or abrupt shifts in enrollment-related variables or major changes in the state's Medicaid program between 1983 and 1984 have been identified. As discussed earlier, Michigan's own DRG-based system of inpatient reimbursement was not implemented until February of 1985, and its PACE system of prior authorization for elective admissions was not implemented until October of 1984. However, anticipatory behavior on the part of providers while those systems were being developed and enacted in late 1983 and the first half of 1984 could have reinforced the impact of Medicare PPS and the associated general pressure on providers to minimize inpatient hospital utilization.

Regardless of the explanation, the dropoff in hospital stays in Michigan from 1983 to 1984 will depress some inpatient hospital measures for the post-PPS period in that state, whether defined by calendar period or by hospital-specific implementation date. Those measures include the readmission and complication rates (aftercare period only) and total inpatient expenditures and days of care per period (key stay, precare, and aftercare). Inpatient measures with admissions in the denominator (e.g., average of length of stay) and measures of non-inpatient utilization, expenditure, and complications (e.g., nursing home admissions) should not be affected by the dropoff in inpatient admissions. To the extent that these reductions are indeed due to the effects of PPS, they represent a significant change in the patterns of post-hospital care over a very short period of time.

Annual Patterns by Nursing Home Residence in Michigan. The dropoff in hospital stays in Michigan from 1983 to 1984 is reflected in the number of key-stay episodes in our data. Table 1A presents various annual averages of health-care utilization and expenditure in the aftercare period for all Michigan episodes from 1981 through 1984. The probability measures represent the proportion of all episodes in which a given service was used in the aftercare period; the aftercare utilization measures are shown as the average amount per 1,000 episodes; and the expenditure measures are presented as the average amount per episode.

Notice first that the number of episodes is much smaller in 1981 and 1984 than in 1982 and 1983. This stems in part from the use of a precare period and an aftercare period surrounding each episode, so that 1981 contains only six months' worth of episodes (those whose key admission date occurred after July 1) and 1984 contains only 10 months' worth of episodes (those whose key discharge date occurred before November 2). On an annualized basis, the number of episodes in 1981 (22,520) is very comparable to the numbers for 1982 (23,398) and 1983 (22,499), but the number for 1984 is much lower (19,082). This doubtless reflects the same factors depressing the total number of inpatient crossover stays (see previous section). As a percentage of those stays, however, 1984's number of episodes is actually a bit higher (71 percent, compared to about 65 percent for each of the other three years).

Most importantly, the patterns evident in Table 1A contradict the hypotheses stated earlier: In general, most measures of aftercare utilization and expenditure decline rather than increase in 1984, after peaking in 1983. The major exceptions are outpatient physician visits, drug prescriptions, and the SNF percentage of total long-term care (SNF plus ICF, excluding mental health and mental retardation services). These three sets of measures are

TABLE 1A

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES

ALL EPISODES

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	11,260	23,398	22,499	15,902	57,157	73,059
PROBABILITY OF USE						
ANY SERVICE	0.972	0.978	0.984	0.981	0.979	0.980
INPATIENT HOSPITAL	0.087	0.120	0.135	0.086	0.119	0.112
INPATIENT SURGERY	0.025	0.023	0.017	0.009	0.021	0.018
OUTPATIENT PHYSICIAN	0.796	0.814	0.847	0.843	0.823	0.828
PRESCRIPTION DRUG	0.886	0.887	0.903	0.903	0.893	0.895
SNF	0.060	0.065	0.069	0.066	0.066	0.066
ICF	0.136	0.157	0.156	0.140	0.153	0.150
SNF OR ICF	0.179	0.202	0.203	0.188	0.198	0.196
HOME HEALTH	0.014	0.015	0.012	0.010	0.013	0.013
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.102	0.142	0.162	0.104	0.142	0.134
INPATIENT DAYS	1.390	1.698	1.815	0.986	1.683	1.531
INPATIENT SURGERIES	0.027	0.026	0.018	0.009	0.023	0.020
OUTPATIENT MD VISITS	3.026	3.043	3.421	3.833	3.188	3.329
DRUG PRESCRIPTIONS	8.493	8.220	8.457	8.749	8.367	8.450
SNF DAYS	2.000	2.160	2.303	2.191	2.185	2.186
ICF DAYS	6.316	7.238	7.173	6.384	7.031	6.890
TOTAL LTC DAYS	8.317	9.398	9.476	8.575	9.216	9.076
SNF % OF TOTAL LTC	24.051	22.985	24.306	25.552	23.709	24.088
HOME HEALTH VISITS	0.112	0.129	0.111	0.086	0.119	0.112
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	59.10	58.29	68.04	58.43	62.29	61.45
INPATIENT PHYSICIAN	21.00	24.69	23.98	15.20	23.68	21.84
OUTPATIENT	55.00	55.06	58.79	53.58	56.51	55.88
PRESCRIPTION DRUG	62.46	58.70	56.88	58.15	58.73	58.60
SNF	51.58	62.20	67.42	68.03	62.16	63.44
ICF	176.01	205.15	209.43	187.40	201.09	198.11
TOTAL LTC	227.59	267.35	276.85	255.42	263.26	261.55
SNF % OF TOTAL LTC	22.66	23.26	24.35	26.63	23.61	24.25
HOME HEALTH	3.48	3.87	3.64	2.85	3.70	3.52
TOTAL AFTERCARE	428.62	467.97	488.18	443.63	468.17	462.83

highest in 1984, capping a four-year upward trend -- suggesting that PPS was not completely responsible for the increase from 1983 to 1984. Inpatient surgery, on the other hand, declines steadily over the four years -- also apparently due to longer-term factors than PPS.

The other measures of outpatient physician and prescription drug services tend to follow the overall pattern, but with some noteworthy aberrations. The probability of prescription drug use is the same in 1984 as in 1983, but both years are higher than are 1981 and 1982. The level of prescription drug expenditure is higher in 1984 than in 1983, but both follow a downward trend in the earlier years. Also, the probability of using outpatient physician care is only slightly lower in 1984 than in 1983, although the level of expenditure for such care does drop sharply in 1984. Finally, although all of the probability and utilization measures for all types of long-term care decline from 1983 to 1984, SNF expenditures per episode follow the same pattern as the SNF percentage of total long-term care expenditures: an ever-smaller increase across the years. Despite these deviations, most measures of aftercare utilization follow the overall pattern by declining substantially in 1984 after peaking in 1983.

Tables 1B and 1C present these same measures for two subpopulations of episodes, respectively: those in which the patient was a resident of a nursing home (SNF or ICF) at the time of key-stay admission, and those in which the patient was not such a resident. The percentage of episodes involving nursing home residents is only about 10 percent in each of the four years (slightly higher in 1982 and 1983). Consequently, the pattern for episodes <u>not</u> involving nursing home residents is virtually identical to the pattern for all episodes.

TABLE 1B

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES

NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	1,105	2,771	2,651	1,703	6,527	8,230
PROBABILITY OF USE						
ANY SERVICE	0.967	0.977	0.987	0.984	0.979	0.980
INPATIENT HOSPITAL	0.081	0.101	0.122	0.096	0.106	0.104
INPATIENT SURGERY	0.020	0.017	0.016	0.010	0.017	0.016
OUTPATIENT PHYSICIAN	0.807	0.826	0.868	0.854	0.840	0.843
PRESCRIPTION DRUG	0.820	0.822	0.833	0.841	0.826	0.829
SNF	0.299	0.294	0.316	0.308	0.304	0.304
ICF	0.693	0.710	0.730	0.672	0.715	0.706
SNF OR ICF	0.900	0.903	0.938	0.900	0.917	0.913
HOME HEALTH	0.000	0.000	0.000	0.001	0.000	0.000
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.084	0.113	0.140	0.112	0.119	0.117
INPATIENT DAYS	1.135	1.512	1.725	1.191	1.535	1.464
INPATIENT SURGERIES	0.020	0.018	0.017	0.010	0.018	0.016
OUTPATIENT MD VISITS	2.461	2.623	3.238	3.637	2.845	3.009
DRUG PRESCRIPTIONS	9.294	8.021	8.355	8.648	8.372	8.429
SNF	11.026	10.565	11.200	11.377	10.901	11.000
ICF	34.575	35.036	35.737	33.421	35.243	34.866
TOTAL LTC	45.601	45.601	46.938	44.799	46.144	45.866
SNF % OF TOTAL LTC	24.179	23.168	23.862	25.397	23.624	23.982
HOME HEALTH VISITS	0.000	0.000	0.000	0.006	0.000	0.001
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	41.31	65.31	86.75	89.60	69.95	74.02
INPATIENT PHYSICIAN	29.28	32.15	30.32	24.60	30.92	29.61
OUTPATIENT	37.80	38.90	41.69	41.21	39.85	40.13
PRESCRIPTION DRUG	65.30	55.31	53.44	53.24	56.24	55.62
SNF	284.26	304.14	325.13	343.96	309.30	316.47
ICF	913.74	949.94	1008.25	936.25	967.50	961.03
TOTAL LTC	1198.00	1254.08	1333.38	1280.22	1276.80	1277.50
SNF % OF TOTAL LTC	23.73	24.25	24.38	26.87	24.22	24.77
HOME HEALTH	0.00	0.00	0.00	0.18	0.00	0.04
TOTAL AFTERCARE	1371.69	1445.75	1545.58	1489.05	1473.76	1476.92

TABLE 1C

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES

NON-NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	10,155	20,627	19,848	14,199	50,630	64,829
PROBABILITY OF USE						
ANY SERVICE	0.973	0.978	0.984	0.981	0.979	0.980
INPATIENT HOSPITAL	0.088	0.122	0.137	0.085	0.121	0.113
INPATIENT SURGERY	0.026	0.024	0.017	0.009	0.022	0.019
OUTPATIENT PHYSICIAN	0.795	0.812	0.845	0.842	0.821	0.826
PRESCRIPTION DRUG	0.893	0.896	0.913	0.910	0.902	0.904
SNF	0.034	0.034	0.036	0.037	0.035	0.035
ICF	0.076	0.083	0.079	0.076	0.080	0.079
SNF OR ICF	0.101	0.107	0.105	0.103	0.105	0.105
HOME HEALTH	0.016	0.016	0.014	0.011	0.015	0.014
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.104	0.146	0.165	0.103	0.145	0.136
INPATIENT DAYS	1.417	1.723	1.827	0.961	1.702	1.540
INPATIENT SURGERIES	0.028	0.027	0.018	0.009	0.023	0.020
OUTPATIENT MD VISITS	3.087	3.099	3.446	3.856	3.233	3.369
DRUG PRESCRIPTIONS	8.406	8.246	8.471	8.761	8.366	8.453
SNF	1.018	1.031	1.115	1.089	1.061	1.068
ICF	3.241	3.504	3.358	3.141	3.394	3.339
TOTAL LTC	4.259	4.535	4.472	4.231	4.455	4.406
SNF % OF TOTAL LTC	23.902	22.738	24.929	25.749	23.823	24.228
HOME HEALTH VISITS	0.124	0.147	0.126	0.096	0.134	0.126
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	61.03	57.35	65.54	54.70	61.30	59.85
INPATIENT PHYSICIAN	20.10	23.69	23.13	14.07	22.75	20.85
OUTPATIENT	56.87	57.23	61.08	55.06	58.66	57.87
PRESCRIPTION DRUG	62.15	59.16	57.34	58.73	59.05	58.98
SNF	26.26	29.70	33.00	34.93	30.30	31.32
ICF	95.74	105.10	102.73	97.58	102.29	101.26
TOTAL LTC	122.00	134.80	135.73	132.51	132.59	132.58
SNF % OF TOTAL LTC	21.52	22.03	24.31	26.36	22.85	23.62
HOME HEALTH	3.86	4.39	4.13	3.17	4.18	3.96
TOTAL AFTERCARE	326.00	336.61	346.95	318.25	338.54	334.09

Episodes involving nursing home residents produce some additional instances in which 1984 displays a higher figure than the previous years. Interestingly, after showing no aftercare utilization or expenditure for home health care in the first three years, nursing home residents suddenly generate a small amount of that type of aftercare in 1984. They also reveal a strong upward trend across the years in inpatient hospital expenditure per episode, even though the inpatient probability and utilization measures follow the majority of indicators by declining in 1984.

The most noticeable differences between nursing home residents and non-residents in Tables 1B and 1C, however, lie in their contrasting levels of utilization and expenditure. Although they show the same overall probability of using any type of health care (0.980), nursing home residents use far more nursing home care (not surprisingly) than do non-residents, but somewhat less of everything else. Although their inpatient hospital stays are slightly shorter and less frequent, those stays tend to be substantially more costly overall. This, coupled with their vastly higher nursing home utilization, make the total aftercare expenditures of nursing home residents over four times as high as those of non-residents.

Pre/Post-PPS Patterns by Nursing Home Residence in Michigan. Table 2A presents the same measures used in the previous tables, broken down instead by PPS status (pre-PPS vs. post-PPS), based on each hospital's exact date of PPS implementation. Because the exact date of PPS implementation was not available for some hospitals, the episodes in which they were involved (852 in Michigan) were lost to this particular analysis. The smaller number of episodes makes the values of some of the measures differ marginally from those observed in the annual analysis (Table 1A).

TABLE 2A

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	60,494	11,713	72,207
PROBABILITY OF USE			
ANY SERVICE	0.979	0.982	0.980
INPATIENT HOSPITAL	0.118	0.081	0.112
INPATIENT SURGERY	0.020	0.009	0.018
OUTPATIENT PHYSICIAN	0.826	0.842	0.828
PRESCRIPTION DRUG	0.894	0.905	0.896
SNF	0.066	0.062	0.066
ICF	0.153	0.138	0.151
SNF OR ICF	0.199	0.184	0.197
HOME HEALTH	0.013	0.009	0.013
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.140	0.098	0.134
INPATIENT DAYS	1.647	0.891	1.524
INPATIENT SURGERIES	0.022	0.009	0.020
OUTPATIENT MD VISITS	3.240	3.829	3.335
DRUG PRESCRIPTIONS	8.378	8.865	8.457
SNF DAYS	2.217	2.050	2.190
ICF DAYS	7.045	6.311	6.926
TOTAL LTC DAYS	9.262	8.360	9.116
SNF % OF TOTAL LTC	23.934	24.516	24.020
HOME HEALTH VISITS	0.118	0.081	0.112
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	64.24	46.96	61.44
INPATIENT PHYSICIAN	23.41	14.07	21.89
OUTPATIENT	56.35	51.78	55.61
PRESCRIPTION DRUG	58.60	58.80	58.64
SNF	63.49	63.69	63.53
ICF	201.92	183.89	198.99
TOTAL LTC	265.41	247.58	262.52
SNF % OF TOTAL LTC	23.92	25.73	24.20
HOME HEALTH	3.71	2.66	3.54
TOTAL AFTERCARE	471.72	421.84	463.63

The patterns of change found in Table 2A nonetheless tend to corroborate those already observed: Aftercare utilization declined following implementation of PPS for all types of service except outpatient physician and prescription drug. The probability of using any type of health service also increased slightly after PPS, as did the SNF percentage of long-term care. Interestingly, despite the increase in outpatient physician utilization, outpatient expenditures actually decreased following PPS implementation. Prescription drug expenditures did increase slightly, however, as did SNF expenditures; but like most other measures, total aftercare expenditures declined noticeably following hospital-specific implementation of PPS.

As with the annual data, Tables 2B and 2C break down the results in Table 2A by nursing home residence. As in Tables 1B and 1C, the patterns of difference between the hospital-specific pre-PPS and post-PPS periods in both patient subgroups are quite similar to those found among all episodes (Table 2A). The most notable differences instead lie in their levels of aftercare utilization and expenditure: In comparison with non-residents, nursing home residents use far more nursing home care, but somewhat less of everything else, and their total aftercare expenditures are over four times higher.

TABLE 2B

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NURSING HOME RESIDENTS
PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	6,940	1,230	8,170
PROBABILITY OF USE			
ANY SERVICE	0.980	0.982	0.981
INPATIENT HOSPITAL	0.107	0.083	0.104
INPATIENT SURGERY	0.018	0.005	0.016
OUTPATIENT PHYSICIAN	0.845	0.846	0.845
PRESCRIPTION DRUG	0.832	0.833	0.832
SNF	0.306	0.290	0.304
ICF	0.712	0.679	0.707
SNF OR ICF	0.916	0.897	0.913
HOME HEALTH	0.000	0.000	0.000
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.121	0.098	0.117
INPATIENT DAYS	1.554	0.912	1.457
INPATIENT SURGERIES	0.018	0.005	0.016
OUTPATIENT MD VISITS	2.954	3.387	3.019
DRUG PRESCRIPTIONS	8.441	8.556	8.459
SNF DAYS	11.027	10.711	10.979
ICF DAYS	35.079	34.075	34.928
TOTAL LTC DAYS	46.106	44.786	45.907
SNF % OF TOTAL LTC	23.916	23.915	23.916
HOME HEALTH VISITS	0.002	0.000	0.001
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	77.58	54.38	74.08
INPATIENT PHYSICIAN	31.04	21.90	29.66
OUTPATIENT	40.58	38.22	40.22
PRESCRIPTION DRUG	56.49	51.88	55.79
SNF	313.61	326.38	315.53
ICF	962.37	954.04	961.12
TOTAL LTC	1275.98	1280.42	1276.65
SNF % OF TOTAL LTC	24.58	25.49	24.72
HOME HEALTH	0.04	0.00	0.04
TOTAL AFTERCARE	1481.70	1446.81	1476.44

TABLE 2C

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	53,554	10,483	64,037
PROBABILITY OF USE			
ANY SERVICE	0.979	0.982	0.980
INPATIENT HOSPITAL	0.120	0.080	0.113
INPATIENT SURGERY	0.021	0.009	0.019
OUTPATIENT PHYSICIAN	0.823	0.842	0.826
PRESCRIPTION DRUG	0.902	0.914	0.904
SNF	0.035	0.035	0.035
ICF	0.081	0.075	0.080
SNF OR ICF	0.106	0.101	0.105
HOME HEALTH	0.015	0.010	0.014
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.143	0.098	0.136
INPATIENT DAYS	1.659	0.988	1.533
INPATIENT SURGERIES	0.022	0.009	0.020
OUTPATIENT MD VISITS	3.277	3.880	3.375
DRUG PRESCRIPTIONS	8.370	8.901	8.457
SNF DAYS	1.075	1.033	1.068
ICF DAYS	3.412	3.053	3.354
TOTAL LTC DAYS	4.488	4.086	4.422
SNF % OF TOTAL LTC	23.957	25.289	24.158
HOME HEALTH VISITS	0.133	0.091	0.126
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	62.52	46.09	59.83
INPATIENT PHYSICIAN	22.42	13.15	20.90
OUTPATIENT	58.39	53.37	57.57
PRESCRIPTION DRUG	58.88	59.61	59.00
SNF	31.08	32.87	31.37
ICF	103.37	93.53	101.76
TOTAL LTC	134.45	126.39	133.13
SNF % OF TOTAL LTC	23.12	26.01	23.57
HOME HEALTH	4.18	2.97	3.98
TOTAL AFTERCARE	340.83	301.58	334.41

Aftercare Admissions and Complications in Michigan. Table 3A presents, for all Michigan episodes, the temporal distribution of inpatient hospital admissions (i.e., readmissions) and nursing home admissions (based on the "service from" date on the first nursing home claim) occurring within various time intervals following discharge from the key hospital stay. Two such distributions are presented for each type of aftercare admission: one based on all episodes, and the other based on only those episodes that had at least one such admission during the aftercare period. If the patient had more than one inpatient readmission in the aftercare period, only the first is counted here. The same rule was applied to nursing home claims. Also presented for the aftercare period in Table 3A are the average length of stay of the inpatient readmissions and the rate of surgical complications, broken down by setting (inpatient, outpatient, and long-term care).

The temporal distributions of aftercare inpatient readmissions and nursing home admissions shown in Table 3A remain fairly stable across the four years. As in the previous tables, the figures generally rise from 1981 through 1983, then decline in 1984. As has been observed in numerous other studies, however, the inpatient average length of stay (ALOS) displays a downward trend across the years -- a trend apparently due to longer-term factors than implementation of PPS. Nevertheless, the drop is steeper between 1983 and 1984 than between the previous years, suggesting that PPS may have accelerated the existing downward trend in ALOS.

There is some slight evidence in Table 3A of a shift across the four years toward later inpatient readmission. That is, the percentage of first admissions occurring within 14 and 30 days of key-stay discharge increases across the years, whereas the percentage occurring on the day of discharge or within seven days of discharge generally declines. As with the surprising

TABLE 3A

MICHIGAN: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

ALL EPISODES

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	11,260	23,398	22,499	15,902	57,157	73,059
INPATIENT HOSPITAL						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	0.7	0.9	1.0	0.5	0.9	0.8
7 DAYS	2.3	2.9	3.3	2.0	2.9	2.7
14 DAYS	3.4	4.6	5.3	3.4	4.7	4.4
30 DAYS	5.5	7.4	8.6	5.7	7.5	7.1
60 DAYS	8.7	12.0	13.5	8.6	11.9	11.2
CUM % OF FIRST ADMISSIONS WITHIN:						
1 DAY	8.1	7.1	7.2	6.1	7.3	7.1
7 DAYS	26.3	23.9	24.2	23.4	24.4	24.2
14 DAYS	39.1	38.7	39.2	39.8	39.0	39.1
30 DAYS	62.9	62.0	63.8	66.6	62.9	63.5
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	13.6	12.0	11.2	9.5	11.9	11.5
NURSING HOME						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	10.2	11.9	12.0	10.7	11.6	11.4
7 DAYS	11.9	13.4	13.7	12.2	13.2	13.0
14 DAYS	13.2	14.9	15.2	13.6	14.7	14.4
30 DAYS	16.3	18.4	18.6	16.9	18.1	17.8
60 DAYS	17.9	20.1	20.3	18.8	19.7	19.5
CUM % OF ADMISSIONS WITHIN:						
1 DAY	57.1	59.1	59.0	56.9	58.7	58.3
7 DAYS	66.4	66.7	67.6	65.0	67.0	66.6
14 DAYS	73.9	74.2	74.8	72.3	74.4	74.0
30 DAYS	91.3	91.4	91.7	90.2	91.5	91.2
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
SURGICAL COMPLICATIONS						
INPATIENT COMPLICATIONS	2.8	4.1	5.1	5.1	4.3	4.4
OUTPATIENT COMPLICATIONS	23.8	39.9	36.9	38.9	35.6	36.3
LONG-TERM CARE COMPLICATNS	1.5	0.7	0.7	0.9	0.9	0.9
TOTAL COMPLICATIONS	28.2	44.8	42.7	44.8	40.7	41.6

decrease in aftercare utilization and expenditure discussed earlier, this finding tends to contradict the "quicker and sicker" hypothesis, which would anticipate earlier readmissions, as well as more frequent and longer ones.

Also intriguing is the fact that the rate of surgical complications increases from 1983 to 1984 in all settings but inpatient, where it levels off after an upward trend from 1981 through 1983. It might be tempting to interpret the overall increase in complications as an indication that PPS is making aftercare-period health conditions worse. However, the pattern is perhaps more indicative of the slight shift to outpatient care observed in the utilization and expenditure results.

Furthermore, this pattern could mean that, if anything, PPS may actually be improving aftercare health conditions rather than making them worse. That is, complications serious enough to require hospitalization appear to be declining slightly, while those that can be handled in outpatient or long-term care settings are increasing slightly. On the other hand, both the outpatient and overall rates of surgical complications show 1982 being at least as high as 1984, whereas the long-term care rate drops from its peak in 1981 before rebounding somewhat in 1984. The real meaning of these patterns is by no means entirely clear.

Tables 3B and 3C present the same measures shown in Table 3A, for nursing home residents and non-residents, respectively. As in the total population of episodes (Table 3A), most of the numbers in these two tables increase from 1981 to 1982 or 1983, then drop back in 1984. The same slight shift to later inpatient readmissions also appears to be present among both subpopulations, with a decrease over time in first admissions that occur on the day of key discharge or within seven days, along with an increase in those that occur within 14 or 30 days. An exception is that, among nursing home residents,

TABLE 3B

MICHIGAN: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	1,105	2,771	2,651	1,703	6,527	8,230
INPATIENT HOSPITAL						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	0.7	0.5	0.6	0.6	0.6	0.6
7 DAYS	2.4	2.3	2.8	1.8	2.5	2.3
14 DAYS	3.0	3.7	4.4	3.6	3.9	3.8
30 DAYS	4.6	6.1	7.4	6.2	6.4	6.4
60 DAYS	8.1	10.1	12.2	9.6	10.6	10.4
CUM % OF FIRST ADMISSIONS WITHIN:						
1 DAY	9.0	5.4	5.3	6.1	5.8	5.9
7 DAYS	29.2	22.6	22.9	18.4	23.6	22.6
14 DAYS	37.1	36.9	36.2	37.4	36.6	36.8
30 DAYS	57.3	60.9	60.7	65.0	60.3	61.2
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	13.5	13.4	12.3	10.7	12.9	12.5
NURSING HOME						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	62.0	64.1	64.0	61.9	63.7	63.3
7 DAYS	70.6	70.8	72.0	69.5	71.2	70.9
14 DAYS	75.7	76.8	78.1	75.3	77.1	76.8
30 DAYS	86.2	86.6	89.5	85.4	87.7	87.2
60 DAYS	89.6	90.1	93.3	89.5	91.3	90.9
CUM % OF ADMISSIONS WITHIN:						
1 DAY	69.2	71.2	68.6	69.2	69.7	69.6
7 DAYS	78.8	78.6	77.1	77.6	78.0	77.9
14 DAYS	84.4	85.3	83.7	84.1	84.5	84.4
30 DAYS	96.2	96.2	95.9	95.3	96.1	95.9
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
SURGICAL COMPLICATIONS						
INPATIENT COMPLICATIONS	1.8	1.4	4.5	4.1	2.8	3.0
OUTPATIENT COMPLICATIONS	7.2	11.5	22.3	15.9	15.2	15.3
LONG-TERM CARE COMPLICATNS	10.0	2.9	4.5	6.5	4.7	5.1
TOTAL COMPLICATIONS	19.0	15.9	31.3	26.4	22.7	23.5

TABLE 3C

MICHIGAN: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

NON-NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	10,155	20,627	19,848	14,199	50,630	64,829
INPATIENT HOSPITAL						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	0.7	0.9	1.0	0.5	0.9	0.8
7 DAYS	2.3	2.9	3.3	2.0	3.0	2.8
14 DAYS	3.5	4.8	5.4	3.4	4.8	4.5
30 DAYS	5.6	7.6	8.8	5.7	7.7	7.2
60 DAYS	8.8	12.2	13.7	8.5	12.1	11.3
CUM % OF FIRST ADMISSIONS WITHIN:						
1 DAY	8.1	7.3	7.4	6.1	7.5	7.2
7 DAYS	26.0	24.1	24.3	24.0	24.5	24.4
14 DAYS	39.3	38.9	39.5	40.2	39.2	39.4
30 DAYS	63.5	62.1	64.1	66.8	63.2	63.8
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	13.6	11.8	11.1	9.3	11.7	11.3
NURSING HOME						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	4.6	4.9	5.0	4.5	4.9	4.8
7 DAYS	5.5	5.7	5.9	5.3	5.8	5.7
14 DAYS	6.4	6.6	6.8	6.2	6.6	6.5
30 DAYS	8.7	9.2	9.1	8.7	9.1	9.0
60 DAYS	10.1	10.7	10.5	10.3	10.5	10.5
CUM % OF ADMISSIONS WITHIN:						
1 DAY	45.5	45.6	47.7	44.1	46.4	45.9
7 DAYS	54.4	53.4	56.4	51.8	54.8	54.1
14 DAYS	63.8	61.7	64.4	60.0	63.1	62.5
30 DAYS	86.5	86.0	86.7	84.8	86.4	86.0
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
SURGICAL COMPLICATIONS						
INPATIENT COMPLICATIONS	3.0	4.5	5.2	5.2	4.5	4.6
OUTPATIENT COMPLICATIONS	25.6	43.7	38.8	41.6	38.2	38.9
LONG-TERM CARE COMPLICATNS	0.6	0.4	0.2	0.2	0.4	0.3
TOTAL COMPLICATIONS	29.1	48.7	44.2	47.0	43.0	43.9

the percentage of first readmissions that occur on the day of key discharge is slightly higher in 1984 than in the overall period of 1981-83.

Interestingly, inpatient ALOS appears to decline less rapidly among nursing home residents than non-residents from 1981 through 1984. Futhermore, despite their lower rate of total surgical complications in each year (due in part to their generally lower rates of surgery -- see Tables 1B and 1C), nursing home residents show a greater concentration of their surgical complications in the inpatient and long-term care setting. This could mean that their complications tend to be more serious than those of non-residents. As in the total population of episodes (Table 2A), the patterns of change over time in surgical complications is quite erratic for both subpopulations.

Table 4A presents the same measures as in the previous three tables broken down by hospital-specific implementation of PPS, generally confirming the annual patterns observed in those tables. The shift to later inpatient readmissions is even more readily apparent in this table, with a lower percentage of post-PPS first admissions that occur on the day of key discharge or within seven days, along with a higher percentage of those that occur within 14 or 30 days.

Not surprisingly, ALOS drops substantially following hospital-specific PPS implementation. Surgical complications also decline after PPS in outpatient settings as well as overall, but they increase somewhat in inpatient and long-term care settings. Contrary to our earlier discussion of the annual patterns for complications, these findings could be interpreted to mean that surgical complications have become more serious following PPS, in that they tend to require institutional care more often. However, it could also mean simply that only the more serious surgical complications are being recorded by physicians.

TABLE 4A

MICHIGAN: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

	PPS STATUS		
	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	60,494	11,713	72,207
INPATIENT HOSPITAL			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	0.8	0.4	0.8
7 DAYS	2.9	1.9	2.7
14 DAYS	4.6	3.2	4.4
30 DAYS	7.5	5.3	7.1
60 DAYS	11.8	8.1	11.2
CUM % OF FIRST ADMISSIONS WITHIN:			
1 DAY	7.1	5.4	6.9
7 DAYS	24.2	23.3	24.1
14 DAYS	39.0	39.2	39.0
30 DAYS	63.2	65.4	63.5
60 DAYS	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	11.7	9.1	11.4
NURSING HOME			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	11.6	10.4	11.5
7 DAYS	13.3	12.0	13.1
14 DAYS	14.8	13.3	14.5
30 DAYS	18.1	16.5	17.9
60 DAYS	19.8	18.4	19.6
CUM % OF ADMISSIONS WITHIN:			
1 DAY	58.7	56.9	58.4
7 DAYS	66.9	65.2	66.6
14 DAYS	74.3	72.2	74.0
30 DAYS	91.4	89.9	91.2
60 DAYS	100.0	100.0	100.0
SURGICAL COMPLICATIONS			
INPATIENT COMPLICATIONS	4.4	4.8	4.5
OUTPATIENT COMPLICATIONS	37.4	32.0	36.5
LONG-TERM CARE COMPLICATIONS	0.8	1.1	0.9
TOTAL COMPLICATIONS	42.6	37.9	41.9

Tables 4B and 4C present the same measures shown in Table 4A, broken down into nursing home residents and non-residents, respectively. The results in these two tables generally corroborate those presented earlier, in that the pattern of differences between the pre-PPS and post-PPS periods for these two patient subgroups are similar not only to the pattern of pre-PPS/post-PPS differences for all episodes, but also to the pattern of differences between the annual periods (1981-83 vs. 1984) for the two patient subgroups. The already noted exception to the general shift toward later inpatient readmissions among nursing home residents is even more pronounced here. Not only is the percentage of first readmissions that occur on the day of key discharge slightly higher in the post-PPS period. Unlike in the annual results (Table 3B), the percentage of first readmissions that occur within thirty days of key discharge is slightly lower. This combination would suggest that nursing home residents are indeed being readmitted somewhat earlier than before PPS. It is not clear why these results differ from the annual results; nor is the choice of which set of results should be embraced.

TABLE 4B

MICHIGAN: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS
PPS STATUS
NURSING HOME RESIDENTS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	6,940	1,230	8,170
INPATIENT HOSPITAL			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	0.6	0.6	0.6
7 DAYS	2.5	1.4	2.3
14 DAYS	4.0	2.8	3.8
30 DAYS	6.6	4.9	6.4
60 DAYS	10.7	8.3	10.4
CUM % OF FIRST ADMISSIONS WITHIN:			
1 DAY	5.6	6.9	5.8
7 DAYS	23.1	16.7	22.3
14 DAYS	37.1	33.3	36.6
30 DAYS	61.7	58.8	61.3
60 DAYS	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	12.9	9.3	12.4
NURSING HOME			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	63.8	61.8	63.5
7 DAYS	71.2	69.6	71.0
14 DAYS	77.1	75.6	76.9
30 DAYS	87.6	85.4	87.3
60 DAYS	91.3	89.2	91.0
CUM % OF ADMISSIONS WITHIN:			
1 DAY	69.9	69.3	69.8
7 DAYS	78.0	78.0	78.0
14 DAYS	84.5	84.8	84.5
30 DAYS	96.0	95.7	95.9
60 DAYS	100.0	100.0	100.0
SURGICAL COMPLICATIONS			
INPATIENT COMPLICATIONS	3.2	2.4	3.1
OUTPATIENT COMPLICATIONS	14.4	21.1	15.4
LONG-TERM CARE COMPLICATIONS	4.6	8.1	5.1
TOTAL COMPLICATIONS	22.2	31.7	23.6

TABLE 4C

MICHIGAN: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS
PPS STATUS
NON-NURSING HOME RESIDENTS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	53,554	10,483	64,037
INPATIENT HOSPITAL			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	0.9	0.4	0.8
7 DAYS	2.9	1.9	2.8
14 DAYS	4.7	3.2	4.4
30 DAYS	7.6	5.3	7.2
60 DAYS	12.0	8.0	11.3
CUM % OF FIRST ADMISSIONS WITHIN:			
1 DAY	7.3	5.2	7.1
7 DAYS	24.4	24.1	24.3
14 DAYS	39.2	39.9	39.3
30 DAYS	63.4	66.2	63.7
60 DAYS	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	11.6	9.0	11.3
NURSING HOME			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	4.9	4.4	4.8
7 DAYS	5.8	5.2	5.7
14 DAYS	6.7	5.9	6.6
30 DAYS	9.1	8.4	9.0
60 DAYS	10.6	10.1	10.5
CUM % OF ADMISSIONS WITHIN:			
1 DAY	46.2	44.0	45.9
7 DAYS	54.5	51.8	54.1
14 DAYS	63.1	59.1	62.4
30 DAYS	86.4	83.8	86.0
60 DAYS	100.0	100.0	100.0
SURGICAL COMPLICATIONS			
INPATIENT COMPLICATIONS	4.6	5.1	4.6
OUTPATIENT COMPLICATIONS	40.4	33.3	39.2
LONG-TERM CARE COMPLICATIONS	0.3	0.3	0.3
TOTAL COMPLICATIONS	45.3	38.6	44.2

Age Differences in Michigan's Annual Patterns. Tables 5A through 5D display the same annual measures for Michigan shown in Tables 1A through 1C, broken down by age group, respectively: under 65, 65 through 74, 75 through 84, and 85 and over. To control for the effects of nursing home residence while maintaining a sufficient number of cases in each age group, these tables contain only episodes that involve non-nursing home residents. There are simply too few episodes involving nursing home residents to distribute by age. As in all other tables in the analysis, episodes involving inpatient psychiatric services have been excluded.

It should also be noted that 24,454 of the total 76,278 episodes in the Michigan data base had missing data on patient date of birth, hence age. Most patients with missing age were eligible for Medicaid on the basis of age rather than disability, and it is likely that most of them were very old and, due to memory lapse or inability to communicate, could not give an accurate date of birth. These tables therefore contain a higher proportion of episodes involving younger, disabled enrollees than do the other tables in the analysis. For readers accustomed to data on Medicare enrollees only, the Medicaid population contains a much higher proportion of disabled enrollees, primarily because SSI eligibility requirements tend to be less stringent than those for Social Security Disability. Also, not all Medicaid disabled enrollees are under 65, for many state Medicaid programs, including Michigan and California, continue to classify them as disabled even after they turn 65.

The annual patterns of aftercare for each age group from 1981 through 1984 deviate more from the overall pattern presented in Table 1A (or 1C) than did the patterns for nursing home residents. Indeed, among those under age 65 (Table 5A), only a few measures follow the same pattern across the years as they did in Table 1A. These include all of the inpatient hospital

TABLE 5A

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
< 65 YEARS OF AGE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	1,861	3,733	3,484	2,353	9,078	11,431
PROBABILITY OF USE						
ANY SERVICE	0.869	0.863	0.842	0.816	0.856	0.848
INPATIENT HOSPITAL	0.076	0.118	0.119	0.072	0.110	0.102
INPATIENT SURGERY	0.020	0.027	0.016	0.007	0.021	0.018
OUTPATIENT PHYSICIAN	0.735	0.738	0.736	0.709	0.737	0.731
PRESCRIPTION DRUG	0.798	0.799	0.785	0.766	0.793	0.788
SNF	0.021	0.010	0.015	0.008	0.014	0.013
ICF	0.019	0.022	0.019	0.014	0.020	0.019
SNF OR ICF	0.035	0.029	0.032	0.022	0.032	0.030
HOME HEALTH	0.019	0.018	0.014	0.011	0.017	0.016
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.097	0.153	0.155	0.099	0.142	0.134
INPATIENT DAYS	1.225	1.799	1.925	0.912	1.730	1.561
INPATIENT SURGERIES	0.022	0.031	0.018	0.008	0.024	0.021
OUTPATIENT MD VISITS	3.087	3.045	3.179	3.737	3.105	3.235
DRUG PRESCRIPTIONS	8.255	7.878	7.926	7.756	7.974	7.929
SNF DAYS	0.643	0.303	0.483	0.265	0.442	0.406
ICF DAYS	0.767	0.931	0.792	0.618	0.844	0.797
TOTAL LTC DAYS	1.410	1.234	1.276	0.883	1.286	1.203
SNF % OF TOTAL LTC	45.627	24.564	37.902	30.008	34.375	33.715
HOME HEALTH VISITS	0.148	0.174	0.155	0.113	0.161	0.151
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	47.89	64.43	77.06	48.69	65.88	62.34
INPATIENT PHYSICIAN	17.13	22.58	23.38	10.91	21.77	19.53
OUTPATIENT	89.07	85.45	91.91	79.46	88.67	86.78
PRESCRIPTION DRUG	64.60	59.53	57.02	59.42	59.61	59.57
SNF	17.11	9.56	12.07	7.20	12.07	11.07
ICF	23.11	24.87	24.17	20.88	24.24	23.55
TOTAL LTC	40.22	34.44	36.24	28.08	36.31	34.62
SNF % OF TOTAL LTC	42.53	27.77	33.31	25.64	33.24	31.97
HOME HEALTH	4.93	5.45	5.46	3.70	5.35	5.01
TOTAL AFTERCARE	263.84	271.87	291.06	230.26	277.59	267.85

TABLE 5B

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
65 - 74 YEARS OF AGE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	2,715	5,037	4,556	3,141	12,308	15,449
PROBABILITY OF USE						
ANY SERVICE	0.946	0.956	0.957	0.957	0.954	0.955
INPATIENT HOSPITAL	0.100	0.142	0.151	0.094	0.136	0.128
INPATIENT SURGERY	0.036	0.028	0.019	0.012	0.027	0.024
OUTPATIENT PHYSICIAN	0.779	0.801	0.835	0.826	0.809	0.812
PRESCRIPTION DRUG	0.880	0.879	0.894	0.904	0.885	0.889
SNF	0.022	0.024	0.027	0.020	0.025	0.024
ICF	0.045	0.047	0.043	0.041	0.045	0.044
SNF OR ICF	0.064	0.065	0.064	0.057	0.064	0.063
HOME HEALTH	0.011	0.014	0.010	0.010	0.012	0.011
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.121	0.172	0.185	0.110	0.166	0.154
INPATIENT DAYS	1.677	2.219	1.938	0.971	1.995	1.787
INPATIENT SURGERIES	0.039	0.031	0.020	0.012	0.029	0.025
OUTPATIENT MD VISITS	3.095	3.024	3.666	3.831	3.277	3.390
DRUG PRESCRIPTIONS	8.681	8.585	8.810	9.201	8.689	8.793
SNF DAYS	0.701	0.670	0.817	0.553	0.731	0.695
ICF DAYS	1.880	1.921	1.662	1.682	1.816	1.789
TOTAL LTC DAYS	2.581	2.591	2.480	2.235	2.548	2.484
SNF % OF TOTAL LTC	27.153	25.863	32.962	24.734	28.709	27.982
HOME HEALTH VISITS	0.118	0.115	0.089	0.089	0.106	0.102
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	88.91	88.04	85.00	68.20	87.11	83.26
INPATIENT PHYSICIAN	22.09	27.19	23.50	14.07	24.70	22.54
OUTPATIENT	54.88	50.99	54.54	46.27	53.16	51.76
PRESCRIPTION DRUG	64.28	62.19	60.02	60.89	61.84	61.65
SNF	18.47	19.49	26.27	19.19	21.78	21.25
ICF	55.71	57.75	52.50	51.41	55.36	54.55
TOTAL LTC	74.18	77.24	78.77	70.60	77.13	75.80
SNF % OF TOTAL LTC	24.90	25.24	33.35	27.18	28.23	28.03
HOME HEALTH	3.94	3.86	3.21	2.95	3.64	3.50
TOTAL AFTERCARE	308.28	309.51	305.05	262.98	307.58	298.51

TABLE 5C

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
75 - 84 YEARS OF AGE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	2,043	4,117	3,687	2,446	9,847	12,293
PROBABILITY OF USE						
ANY SERVICE	0.965	0.961	0.967	0.966	0.964	0.965
INPATIENT HOSPITAL	0.098	0.128	0.148	0.085	0.129	0.120
INPATIENT SURGERY	0.027	0.023	0.019	0.007	0.022	0.019
OUTPATIENT PHYSICIAN	0.794	0.794	0.831	0.836	0.808	0.814
PRESCRIPTION DRUG	0.880	0.870	0.892	0.890	0.880	0.882
SNF	0.042	0.053	0.047	0.049	0.049	0.049
ICF	0.107	0.118	0.105	0.098	0.110	0.108
SNF OR ICF	0.139	0.157	0.138	0.132	0.146	0.143
HOME HEALTH	0.019	0.018	0.014	0.010	0.017	0.015
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.113	0.146	0.180	0.102	0.152	0.142
INPATIENT DAYS	1.568	1.781	1.965	0.962	1.805	1.638
INPATIENT SURGERIES	0.028	0.026	0.019	0.007	0.024	0.020
OUTPATIENT MD VISITS	3.292	3.151	3.238	3.608	3.213	3.291
DRUG PRESCRIPTIONS	7.937	7.597	7.916	8.140	7.787	7.857
SNF DAYS	1.137	1.662	1.504	1.448	1.494	1.485
ICF DAYS	4.498	4.821	4.355	4.018	4.580	4.468
TOTAL LTC DAYS	5.635	6.483	5.859	5.466	6.073	5.953
SNF % OF TOTAL LTC	20.172	25.641	25.666	26.496	24.597	24.944
HOME HEALTH VISITS	0.127	0.131	0.112	0.063	0.123	0.111
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	67.21	61.95	69.33	45.17	65.81	61.70
INPATIENT PHYSICIAN	20.87	24.51	23.82	14.73	23.50	21.75
OUTPATIENT	45.09	46.14	47.98	43.32	46.61	45.96
PRESCRIPTION DRUG	57.18	53.15	52.31	51.58	53.67	53.26
SNF	27.60	48.74	44.42	45.99	42.74	43.39
ICF	135.01	144.36	135.41	124.38	139.07	136.15
TOTAL LTC	162.61	193.10	179.83	170.37	181.81	179.53
SNF % OF TOTAL LTC	16.98	25.24	24.70	26.99	23.51	24.17
HOME HEALTH	3.88	3.92	3.42	1.88	3.73	3.36
TOTAL AFTERCARE	356.85	382.78	376.70	327.05	375.13	365.56

TABLE 5D

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
85 YEARS OF AGE OR OLDER

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	1,192	2,285	1,940	1,275	5,417	6,692
PROBABILITY OF USE						
ANY SERVICE	0.966	0.970	0.982	0.971	0.974	0.973
INPATIENT HOSPITAL	0.090	0.108	0.138	0.060	0.115	0.104
INPATIENT SURGERY	0.020	0.014	0.016	0.005	0.016	0.014
OUTPATIENT PHYSICIAN	0.747	0.755	0.796	0.777	0.768	0.770
PRESCRIPTION DRUG	0.853	0.837	0.868	0.881	0.852	0.857
SNF	0.083	0.081	0.090	0.076	0.085	0.083
ICF	0.211	0.217	0.236	0.195	0.223	0.217
SNF OR ICF	0.269	0.271	0.296	0.244	0.280	0.273
HOME HEALTH	0.013	0.021	0.014	0.016	0.017	0.017
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.101	0.123	0.157	0.067	0.131	0.118
INPATIENT DAYS	1.519	1.503	1.804	0.830	1.614	1.465
INPATIENT SURGERIES	0.020	0.014	0.018	0.005	0.016	0.014
OUTPATIENT MD VISITS	3.004	3.049	2.789	2.880	2.946	2.934
DRUG PRESCRIPTIONS	7.008	6.565	6.721	7.377	6.718	6.844
SNF DAYS	2.422	2.334	2.666	2.300	2.472	2.439
ICF DAYS	9.268	9.175	10.403	8.334	9.635	9.387
TOTAL LTC DAYS	11.689	11.509	13.069	10.633	12.107	11.827
SNF % OF TOTAL LTC	20.718	20.281	20.398	21.625	20.419	20.626
HOME HEALTH VISITS	0.075	0.152	0.123	0.177	0.125	0.135
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	45.00	18.63	34.62	46.79	30.16	33.33
INPATIENT PHYSICIAN	20.26	23.77	22.47	14.51	22.53	21.00
OUTPATIENT	36.98	38.32	36.22	33.48	37.27	36.55
PRESCRIPTION DRUG	48.81	43.12	42.24	44.81	44.05	44.20
SNF	60.72	61.27	74.22	69.59	65.79	66.51
ICF	268.14	278.92	318.37	259.04	290.68	284.65
TOTAL LTC	328.86	340.19	392.59	328.63	356.46	351.16
SNF % OF TOTAL LTC	18.46	18.01	18.91	21.18	18.46	18.94
HOME HEALTH	2.12	4.55	3.78	5.64	3.74	4.10
TOTAL AFTERCARE	482.03	468.56	531.91	473.85	494.21	490.33

measures, plus expenditures for drugs, home health care, and total aftercare. Interestingly, the probability of any service use declines steadily across the four years, rather than peaking in 1983, and the SNF measures and drug prescriptions also generally decline. Most of the other measures still peak in 1982 or 1983, although the patterns are a bit more erratic than in the overall results.

In the two middle age groups, the number of measures conforming to the annual patterns which they displayed in Table 1C is higher, and the extent of their deviations is lower. In the 65-74 age group (Table 5B), the measures that most consistently deviate from their overall patterns are the long-term care utilization and expenditure measures. Even there, however, the only difference is usually that they peak in 1982 rather than 1983, or vice versa. This slight deviation also characterizes inpatient days and total aftercare expenditures. Despite equally minor variations from their overall patterns, prescription drug use still generally increases while home health care generally decreases.

In the 75-84 age group (Table 5C), most measures follow the same general trends that they established in Table 1C, with only slightly different peaks and valleys. The over 85 age group (Table 5D), on the other hand, generates almost as numerous and extensive deviations from the overall patterns found in Table 1C as does the under 65 age group. Several measures do follow their overall patterns, notably inpatient hospital probability of use and number of stays, and prescription drug utilization and expenditures. Unlike among the entire population of episodes, inpatient hospital expenditure in this oldest age group continued to rise in 1984. The home health measures, which had declined in 1984 in the overall results, instead show an upturn in 1984 in the over 85 age group.

Age Differences in Michigan's Pre/Post-PPS Patterns. When broken down by hospital-specific implementation of PPS rather than by year, as presented in Tables 6A through 6D, the deviations of the four age groups from the overall pattern for non-nursing home residents (Table 2C) are much less noticeable. (Recall that some episodes are lost to this analysis due to missing PPS implementation dates.) Aftercare utilization in all four age groups is still much lower in the post-PPS period than in the pre-PPS period, with the exceptions continuing to be the probability of any service use, outpatient physician visits, the SNF percentage of both total LTC days and LTC expenditures, and all three prescription drug measures.

Deviations from this overall pattern do, of course, occur in each age group. Unlike in Table 2C, SNF expenditures and the SNF percentage of total LTC days and expenditures all decline in the post-PPS period in the under 65 age group (Table 6A). In the 65-74 age group (Table 6B), the probability of using outpatient physician services rises in the post-PPS period, which is more in line with the usual increase in outpatient physician visits. The 75-84 age group (Table 6C) also shows the outpatient physician probability rising. Furthermore, it displays a slight increase in all SNF measures. The 85 and over age group (Table 6D) also produces slight increases in SNF days and the SNF percentage of total LTC expenditures. The oldest age group also consumed substantially more home health care in the post-PPS period, in terms of both visits and dollars. Yet it is also the only age group to show a decrease in the overall probability of using any health service.

It is also interesting to note the differences among the four age groups in terms of their levels of health-care utilization and expenditure over the four years. In general, the use of inpatient services is highest in the 65-74 age group and lowest in the 85 and over age group. The use of

TABLE 6A

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
< 65 YEARS OF AGE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	8,296	1,411	9,707
PROBABILITY OF USE			
ANY SERVICE	0.978	0.979	0.978
INPATIENT HOSPITAL	0.123	0.082	0.117
INPATIENT SURGERY	0.024	0.005	0.021
OUTPATIENT PHYSICIAN	0.846	0.843	0.845
PRESCRIPTION DRUG	0.908	0.921	0.910
SNF	0.016	0.009	0.015
ICF	0.023	0.016	0.022
SNF OR ICF	0.036	0.024	0.034
HOME HEALTH	0.020	0.011	0.018
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.160	0.115	0.153
INPATIENT DAYS	1.935	0.983	1.796
INPATIENT SURGERIES	0.027	0.005	0.024
OUTPATIENT MD VISITS	3.579	4.658	3.736
DRUG PRESCRIPTIONS	9.109	9.551	9.173
SNF DAYS	0.494	0.240	0.457
ICF DAYS	0.951	0.703	0.915
TOTAL LTC DAYS	1.445	0.942	1.372
SNF % OF TOTAL LTC	34.210	25.420	33.332
HOME HEALTH VISITS	0.183	0.105	0.172
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	76.86	46.44	72.44
INPATIENT PHYSICIAN	24.63	11.25	22.68
OUTPATIENT	99.77	94.91	99.06
PRESCRIPTION DRUG	68.17	73.72	68.98
SNF	13.53	6.68	12.54
ICF	27.70	23.18	27.04
TOTAL LTC	41.23	29.86	39.58
SNF % OF TOTAL LTC	32.82	22.37	31.67
HOME HEALTH	6.16	3.22	5.74
TOTAL AFTERCARE	316.82	259.40	308.47

TABLE 6B

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
65 - 74 YEARS OF AGE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	12,617	2,265	14,882
PROBABILITY OF USE			
ANY SERVICE	0.979	0.987	0.980
INPATIENT HOSPITAL	0.140	0.084	0.131
INPATIENT SURGERY	0.026	0.012	0.024
OUTPATIENT PHYSICIAN	0.831	0.855	0.834
PRESCRIPTION DRUG	0.910	0.929	0.913
SNF	0.025	0.021	0.024
ICF	0.046	0.043	0.046
SNF OR ICF	0.065	0.060	0.065
HOME HEALTH	0.012	0.011	0.012
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.169	0.098	0.159
INPATIENT DAYS	2.017	0.754	1.825
INPATIENT SURGERIES	0.028	0.012	0.026
OUTPATIENT MD VISITS	3.393	3.974	3.482
DRUG PRESCRIPTIONS	8.909	9.627	9.018
SNF DAYS	0.736	0.580	0.713
ICF DAYS	1.874	1.729	1.852
TOTAL LTC DAYS	2.611	2.309	2.565
SNF % OF TOTAL LTC	28.207	25.105	27.782
HOME HEALTH VISITS	0.110	0.089	0.106
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	92.70	45.35	85.50
INPATIENT PHYSICIAN	25.00	12.65	23.12
OUTPATIENT	54.37	45.90	53.08
PRESCRIPTION DRUG	63.15	63.78	63.24
SNF	22.22	19.68	21.83
ICF	56.91	53.98	56.47
TOTAL LTC	79.13	73.66	78.30
SNF % OF TOTAL LTC	28.08	26.71	27.88
HOME HEALTH	3.75	2.94	3.63
TOTAL AFTERCARE	318.11	244.29	306.87

TABLE 6C

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
75 - 84 YEARS OF AGE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	10,213	1,806	12,019
PROBABILITY OF USE			
ANY SERVICE	0.976	0.980	0.977
INPATIENT HOSPITAL	0.128	0.084	0.122
INPATIENT SURGERY	0.021	0.008	0.019
OUTPATIENT PHYSICIAN	0.821	0.844	0.825
PRESCRIPTION DRUG	0.891	0.909	0.894
SNF	0.049	0.050	0.049
ICF	0.111	0.096	0.109
SNF OR ICF	0.147	0.133	0.145
HOME HEALTH	0.017	0.009	0.016
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.151	0.101	0.144
INPATIENT DAYS	1.770	0.961	1.648
INPATIENT SURGERIES	0.023	0.008	0.021
OUTPATIENT MD VISITS	3.315	3.537	3.348
DRUG PRESCRIPTIONS	7.886	8.383	7.960
SNF DAYS	1.483	1.612	1.503
ICF DAYS	4.622	3.908	4.515
TOTAL LTC DAYS	6.105	5.520	6.017
SNF % OF TOTAL LTC	24.294	29.207	24.971
HOME HEALTH VISITS	0.123	0.059	0.114
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	65.72	42.83	62.28
INPATIENT PHYSICIAN	23.51	14.23	22.11
OUTPATIENT	47.28	43.33	46.69
PRESCRIPTION DRUG	54.02	53.23	53.90
SNF	42.88	50.08	43.96
ICF	141.22	117.72	137.69
TOTAL LTC	184.10	167.80	181.65
SNF % OF TOTAL LTC	23.29	29.85	24.20
HOME HEALTH	3.74	1.74	3.44
TOTAL AFTERCARE	378.37	323.15	370.07

TABLE 6D

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
85 YEARS OF AGE OR OVER

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	5,683	917	6,600
PROBABILITY OF USE			
ANY SERVICE	0.979	0.975	0.978
INPATIENT HOSPITAL	0.113	0.055	0.105
INPATIENT SURGERY	0.015	0.007	0.014
OUTPATIENT PHYSICIAN	0.774	0.775	0.774
PRESCRIPTION DRUG	0.859	0.882	0.862
SNF	0.085	0.075	0.084
ICF	0.220	0.209	0.219
SNF OR ICF	0.277	0.260	0.275
HOME HEALTH	0.017	0.016	0.017
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.129	0.059	0.119
INPATIENT DAYS	1.573	0.752	1.459
INPATIENT SURGERIES	0.015	0.007	0.014
OUTPATIENT MD VISITS	2.972	2.883	2.960
DRUG PRESCRIPTIONS	6.782	7.543	6.888
SNF DAYS	2.500	2.179	2.455
ICF DAYS	9.521	9.061	9.457
TOTAL LTC DAYS	12.021	11.240	11.913
SNF % OF TOTAL LTC	20.797	19.388	20.612
HOME HEALTH VISITS	0.130	0.179	0.136
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	34.68	21.54	32.85
INPATIENT PHYSICIAN	22.39	13.77	21.19
OUTPATIENT	37.49	31.98	36.72
PRESCRIPTION DRUG	44.18	46.36	44.48
SNF	66.88	67.14	66.92
ICF	288.21	276.67	286.61
TOTAL LTC	355.09	343.81	353.52
SNF % OF TOTAL LTC	18.84	19.53	18.93
HOME HEALTH	3.93	5.55	4.16
TOTAL AFTERCARE	497.75	463.01	492.93

outpatient and prescription drug services, on the other hand, declines with age, as does the SNF percentage of total LTC days and expenditures. The use of home health services declines across the first three age groups, but then increases a bit among those age 85 and over. Nursing home care, on the other hand, increases with age, as do total aftercare expenditures, except that the under 65 age group is slightly higher than the 75 to 84 age group.

Differences among Diagnoses in Michigan's Annual Patterns. As a simple means of controlling for patient case mix, Tables 7A through 7I present the same measures shown in previous tables for each of nine selected key-stay diagnoses (see Figure 2) among non-nursing home residents. Note that the number of episodes for some of these diagnoses is extremely small, especially in 1981 and 1984 (see the discussion of Table 1A). This is particularly true of total hip replacement (195 episodes in all four years), inguinal hernia repair (343 episodes), and chronic pulmonary heart disease (36 episodes). Small numbers of cases tend to yield highly unstable patterns, particularly in the least frequently used service categories, such as home health care. To expedite comparison of this many tables, the discussion will focus on total aftercare expenditures per episode (in 1981 dollars) as a summary measure.

All but three of the diagnoses yield lower total aftercare expenditures in 1984 than in 1981, suggesting a general decline over time. The exceptions are pneumonia, chronic pulmonary heart disease, and acute myocardial infarction. Moreover, none of the diagnoses show expenditures being at their highest in 1984. No discernible pattern characterizes the years in which they peak: 1981 for total hip replacement, inguinal hernia repair, congestive heart failure, transurethral prostatectomy, and lens extraction; 1982 for stroke, pneumonia, and chronic pulmonary heart disease; and 1983 for acute

TABLE 7A

Michigan: Aftercare Period
Utilization and Expenditures
Non-Nursing Home Residents
Diagnosis: Stroke

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	225	539	500	420	1,264	1,684
PROBABILITY OF USE						
ANY SERVICE	0.969	0.974	0.994	0.983	0.981	0.982
INPATIENT HOSPITAL	0.120	0.139	0.158	0.093	0.143	0.131
INPATIENT SURGERY	0.049	0.026	0.026	0.007	0.030	0.024
OUTPATIENT PHYSICIAN	0.764	0.813	0.872	0.864	0.828	0.837
PRESCRIPTION DRUG	0.836	0.824	0.852	0.833	0.837	0.836
SNF	0.142	0.134	0.146	0.164	0.140	0.146
ICF	0.178	0.195	0.162	0.162	0.179	0.175
SNF OR ICF	0.284	0.291	0.266	0.295	0.280	0.284
HOME HEALTH	0.000	0.020	0.006	0.005	0.011	0.010
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.129	0.169	0.192	0.107	0.171	0.155
INPATIENT DAYS	1.853	2.362	3.230	1.500	2.615	2.337
INPATIENT SURGERIES	0.049	0.026	0.026	0.007	0.030	0.024
OUTPATIENT MD VISITS	3.458	3.913	4.890	4.576	4.218	4.308
DRUG PRESCRIPTIONS	7.862	7.403	7.262	7.190	7.429	7.369
SNF DAYS	4.666	4.252	4.467	4.719	4.411	4.488
ICF DAYS	6.560	6.826	5.650	5.651	6.314	6.148
TOTAL LTC DAYS	11.226	11.078	10.118	10.369	10.724	10.636
SNF % OF TOTAL LTC	41.562	38.382	44.153	45.504	41.129	42.193
HOME HEALTH VISITS	0.000	0.145	0.038	0.045	0.077	0.069
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	69.50	66.13	95.64	61.16	78.40	74.10
INPATIENT PHYSICIAN	32.20	31.03	32.72	20.37	31.91	29.03
OUTPATIENT	46.28	54.40	56.18	46.96	53.66	51.99
PRESCRIPTION DRUG	56.56	51.39	46.40	43.55	50.34	48.64
SNF	132.45	137.78	151.11	164.28	142.10	147.63
ICF	201.58	225.73	186.51	188.97	205.92	201.69
TOTAL LTC	334.03	363.52	337.61	353.25	348.02	349.33
SNF % OF TOTAL LTC	39.65	37.90	44.76	46.50	40.83	42.26
HOME HEALTH	0.00	4.76	1.33	1.77	2.56	2.36
TOTAL AFTERCARE	538.57	571.22	569.90	527.07	564.88	555.45

TABLE 7B

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: PNEUMONIA

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	269	685	708	497	1,662	2,159
PROBABILITY OF USE						
ANY SERVICE	0.978	0.980	0.992	0.988	0.984	0.985
INPATIENT HOSPITAL	0.086	0.120	0.158	0.107	0.131	0.125
INPATIENT SURGERY	0.022	0.016	0.013	0.010	0.016	0.014
OUTPATIENT PHYSICIAN	0.777	0.797	0.833	0.823	0.809	0.812
PRESCRIPTION DRUG	0.903	0.908	0.912	0.934	0.909	0.915
SNF	0.037	0.045	0.045	0.046	0.044	0.044
ICF	0.126	0.149	0.137	0.123	0.140	0.136
SNF OR ICF	0.149	0.175	0.169	0.163	0.168	0.167
HOME HEALTH	0.004	0.010	0.007	0.008	0.008	0.008
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.093	0.139	0.186	0.119	0.152	0.144
INPATIENT DAYS	1.327	1.696	1.945	1.433	1.742	1.671
INPATIENT SURGERIES	0.022	0.016	0.013	0.010	0.016	0.014
OUTPATIENT MD VISITS	2.996	3.023	3.287	3.360	3.131	3.184
DRUG PRESCRIPTIONS	8.442	7.876	7.493	8.408	7.804	7.943
SNF DAYS	1.100	1.319	1.257	1.357	1.257	1.280
ICF DAYS	5.974	6.579	6.114	5.933	6.283	6.202
TOTAL LTC DAYS	7.074	7.898	7.371	7.290	7.540	7.483
SNF % OF TOTAL LTC	15.553	16.697	17.059	18.615	16.674	17.109
HOME HEALTH VISITS	0.004	0.172	0.067	0.057	0.100	0.090
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	19.48	44.68	61.52	54.46	47.78	49.32
INPATIENT PHYSICIAN	21.44	27.98	27.07	17.15	26.54	24.38
OUTPATIENT	49.81	44.54	47.08	44.23	46.48	45.96
PRESCRIPTION DRUG	60.28	55.00	48.47	53.26	53.07	53.11
SNF	37.30	34.27	31.27	41.25	33.49	35.27
ICF	149.54	187.42	164.04	167.76	171.33	170.51
TOTAL LTC	186.84	221.69	195.32	209.01	204.82	205.78
SNF % OF TOTAL LTC	19.96	15.46	16.01	19.74	16.35	17.14
HOME HEALTH	0.13	6.22	2.48	1.69	3.64	3.19
TOTAL AFTERCARE	337.97	400.12	381.94	379.79	382.32	381.73

TABLE 7C

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: TOTAL HIP REPLACEMENT

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	33	54	59	49	146	195
PROBABILITY OF USE						
ANY SERVICE	1.000	0.981	1.000	1.000	0.993	0.995
INPATIENT HOSPITAL	0.061	0.074	0.085	0.020	0.075	0.062
INPATIENT SURGERY	0.061	0.000	0.017	0.000	0.021	0.015
OUTPATIENT PHYSICIAN	0.970	0.852	0.915	0.857	0.904	0.892
PRESCRIPTION DRUG	0.818	0.759	0.898	0.878	0.829	0.841
SNF	0.030	0.093	0.051	0.082	0.062	0.067
ICF	0.121	0.130	0.051	0.122	0.096	0.103
SNF OR ICF	0.121	0.185	0.068	0.184	0.123	0.138
HOME HEALTH	0.030	0.000	0.017	0.000	0.014	0.010
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.091	0.074	0.102	0.020	0.089	0.072
INPATIENT DAYS	1.818	1.500	0.983	0.265	1.363	1.087
INPATIENT SURGERIES	0.061	0.000	0.017	0.000	0.021	0.015
OUTPATIENT MD VISITS	1.758	2.926	2.441	2.776	2.466	2.544
DRUG PRESCRIPTIONS	6.273	5.370	6.508	7.224	6.034	6.333
SNF DAYS	0.455	1.870	0.964	2.063	1.184	1.405
ICF DAYS	3.879	4.667	1.476	3.733	3.199	3.333
TOTAL LTC DAYS	4.333	6.537	2.441	5.796	4.384	4.738
SNF % OF TOTAL LTC	10.490	28.612	39.514	35.599	27.016	29.654
HOME HEALTH VISITS	0.485	0.000	0.102	0.000	0.151	0.113
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	102.11	11.44	4.40	0.10	29.09	21.80
INPATIENT PHYSICIAN	15.33	5.98	12.09	12.33	10.57	11.01
OUTPATIENT	56.82	43.41	42.99	37.74	46.27	44.13
PRESCRIPTION DRUG	51.52	38.25	39.58	46.56	41.79	42.99
SNF	11.05	53.92	33.30	97.44	35.90	51.36
ICF	94.64	142.29	59.31	136.43	97.99	107.65
TOTAL LTC	105.69	196.22	92.61	233.87	133.89	159.01
SNF % OF TOTAL LTC	10.46	27.48	35.95	41.67	26.81	32.30
HOME HEALTH	10.19	0.00	5.03	0.00	4.34	3.25
TOTAL AFTERCARE	341.66	295.30	196.72	330.60	265.94	282.19

TABLE 7D

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: INGUINAL HERNIA REPAIR

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	62	102	104	75	268	343
PROBABILITY OF USE						
ANY SERVICE	0.919	0.931	0.933	0.960	0.929	0.936
INPATIENT HOSPITAL	0.016	0.029	0.096	0.027	0.052	0.047
INPATIENT SURGERY	0.016	0.010	0.038	0.000	0.022	0.017
OUTPATIENT PHYSICIAN	0.677	0.686	0.702	0.760	0.690	0.706
PRESCRIPTION DRUG	0.823	0.843	0.808	0.853	0.825	0.831
SNF	0.000	0.020	0.000	0.013	0.007	0.009
ICF	0.048	0.039	0.038	0.067	0.041	0.047
SNF OR ICF	0.048	0.059	0.038	0.080	0.049	0.055
HOME HEALTH	0.016	0.000	0.000	0.000	0.004	0.003
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.016	0.029	0.106	0.027	0.056	0.050
INPATIENT DAYS	0.887	0.294	0.615	0.133	0.556	0.464
INPATIENT SURGERIES	0.016	0.010	0.038	0.000	0.022	0.017
OUTPATIENT MD VISITS	1.903	2.088	1.423	2.507	1.787	1.945
DRUG PRESCRIPTIONS	5.468	5.176	4.760	4.587	5.082	4.974
SNF DAYS	0.000	0.814	0.000	0.800	0.310	0.417
ICF DAYS	1.408	2.108	1.885	3.107	1.859	2.132
TOTAL LTC DAYS	1.408	2.922	1.885	3.907	2.169	2.549
SNF % OF TOTAL LTC	0.000	27.852	0.000	20.478	14.279	16.356
HOME HEALTH VISITS	0.016	0.000	0.000	0.000	0.004	0.003
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	83.80	4.90	34.13	0.21	34.49	27.00
INPATIENT PHYSICIAN	6.12	6.57	9.99	4.76	7.79	7.13
OUTPATIENT	27.32	27.74	25.66	48.50	26.83	31.57
PRESCRIPTION DRUG	38.63	33.05	31.71	28.10	33.82	32.57
SNF	0.00	20.74	0.00	25.87	7.89	11.82
ICF	55.06	47.42	42.91	91.37	47.44	57.05
TOTAL LTC	55.06	68.16	42.91	117.25	55.33	68.87
SNF % OF TOTAL LTC	0.00	30.43	0.00	22.07	14.27	17.17
HOME HEALTH	0.73	0.00	0.00	0.00	0.17	0.13
TOTAL AFTERCARE	211.67	140.41	144.40	198.82	158.44	167.27

TABLE 7E

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CONGESTIVE HEART FAILURE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	550	1,146	1,159	891	2,855	3,746
PROBABILITY OF USE						
ANY SERVICE	0.976	0.986	0.994	0.984	0.987	0.987
INPATIENT HOSPITAL	0.100	0.173	0.184	0.132	0.163	0.156
INPATIENT SURGERY	0.022	0.014	0.016	0.004	0.016	0.014
OUTPATIENT PHYSICIAN	0.809	0.837	0.861	0.840	0.841	0.841
PRESCRIPTION DRUG	0.915	0.935	0.946	0.945	0.935	0.938
SNF	0.035	0.018	0.029	0.026	0.026	0.026
ICF	0.100	0.079	0.091	0.073	0.088	0.084
SNF OR ICF	0.129	0.092	0.113	0.088	0.108	0.103
HOME HEALTH	0.018	0.016	0.015	0.013	0.016	0.015
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.120	0.207	0.217	0.168	0.194	0.188
INPATIENT DAYS	1.751	2.401	2.399	1.596	2.275	2.113
INPATIENT SURGERIES	0.022	0.014	0.016	0.004	0.016	0.014
OUTPATIENT MD VISITS	3.907	3.401	3.939	4.057	3.717	3.798
DRUG PRESCRIPTIONS	10.504	10.314	10.900	11.341	10.588	10.767
SNF DAYS	0.995	0.552	0.864	0.740	0.764	0.758
ICF DAYS	4.324	3.391	3.946	2.993	3.796	3.605
TOTAL LTC DAYS	5.319	3.943	4.809	3.733	4.560	4.363
SNF % OF TOTAL LTC	18.699	13.993	17.956	19.834	16.748	17.376
HOME HEALTH VISITS	0.098	0.298	0.097	0.127	0.178	0.166
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	116.32	69.52	71.28	75.45	79.25	78.35
INPATIENT PHYSICIAN	23.05	27.08	26.30	16.37	25.99	23.70
OUTPATIENT	57.31	58.07	58.90	42.76	58.26	54.57
PRESCRIPTION DRUG	71.65	67.61	68.08	70.11	68.58	68.94
SNF	22.46	14.82	26.06	21.79	20.86	21.08
ICF	128.80	104.91	127.86	93.19	118.83	112.73
TOTAL LTC	151.25	119.74	153.92	114.98	139.69	133.81
SNF % OF TOTAL LTC	14.85	12.38	16.93	18.95	14.93	15.75
HOME HEALTH	3.37	5.01	3.63	3.73	4.13	4.04
TOTAL AFTERCARE	422.94	347.02	382.12	323.39	375.89	363.41

TABLE 7F

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: ACUTE MYOCARDIAL INFARCTION

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	147	324	289	238	760	998
PROBABILITY OF USE						
ANY SERVICE	0.980	0.969	0.979	0.975	0.975	0.975
INPATIENT HOSPITAL	0.136	0.123	0.173	0.109	0.145	0.136
INPATIENT SURGERY	0.027	0.009	0.021	0.004	0.017	0.014
OUTPATIENT PHYSICIAN	0.789	0.812	0.855	0.857	0.824	0.832
PRESCRIPTION DRUG	0.925	0.898	0.941	0.912	0.920	0.918
SNF	0.007	0.015	0.021	0.021	0.016	0.017
ICF	0.020	0.046	0.059	0.076	0.046	0.053
SNF OR ICF	0.027	0.056	0.069	0.097	0.055	0.065
HOME HEALTH	0.000	0.022	0.017	0.004	0.016	0.013
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.143	0.160	0.239	0.122	0.187	0.171
INPATIENT DAYS	1.986	1.583	2.547	0.786	2.028	1.731
INPATIENT SURGERIES	0.027	0.009	0.021	0.004	0.017	0.014
OUTPATIENT MD VISITS	3.776	3.534	4.170	4.676	3.822	4.026
DRUG PRESCRIPTIONS	10.789	10.580	10.979	10.592	10.772	10.729
SNF DAYS	0.259	0.494	0.819	0.479	0.572	0.550
ICF DAYS	0.340	1.680	2.327	2.870	1.667	1.954
TOTAL LTC DAYS	0.599	2.174	3.146	3.349	2.239	2.504
SNF % OF TOTAL LTC	43.182	22.714	26.024	14.304	25.541	21.957
HOME HEALTH VISITS	0.000	0.105	0.044	0.008	0.061	0.049
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	27.60	37.42	40.07	28.18	36.53	34.54
INPATIENT PHYSICIAN	27.94	23.45	27.10	16.13	25.70	23.42
OUTPATIENT	54.82	46.58	51.89	41.85	50.19	48.20
PRESCRIPTION DRUG	76.14	77.70	80.06	75.18	78.29	77.55
SNF	8.18	12.67	25.83	22.62	16.81	18.19
ICF	10.75	64.85	80.62	93.61	60.38	68.30
TOTAL LTC	18.93	77.52	106.45	116.23	77.19	86.50
SNF % OF TOTAL LTC	43.23	16.34	24.27	19.46	21.77	21.03
HOME HEALTH	0.00	3.82	1.73	0.37	2.29	1.83
TOTAL AFTERCARE	205.43	266.48	307.29	277.93	270.19	272.04

TABLE 7G

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: TRANSURETHRAL PROSTATECTOMY

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	88	131	130	126	349	475
PROBABILITY OF USE						
ANY SERVICE	1.000	0.969	0.985	0.984	0.983	0.983
INPATIENT HOSPITAL	0.125	0.076	0.085	0.032	0.092	0.076
INPATIENT SURGERY	0.091	0.008	0.015	0.016	0.032	0.027
OUTPATIENT PHYSICIAN	0.784	0.817	0.808	0.770	0.805	0.796
PRESCRIPTION DRUG	0.943	0.931	0.923	0.937	0.931	0.933
SNF	0.011	0.008	0.038	0.032	0.020	0.023
ICF	0.068	0.031	0.054	0.063	0.049	0.053
SNF OR ICF	0.068	0.038	0.077	0.087	0.060	0.067
HOME HEALTH	0.023	0.023	0.000	0.008	0.014	0.013
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.136	0.092	0.085	0.032	0.100	0.082
INPATIENT DAYS	1.955	1.275	0.654	0.333	1.215	0.981
INPATIENT SURGERIES	0.091	0.008	0.015	0.016	0.032	0.027
OUTPATIENT MD VISITS	2.364	2.443	2.877	2.389	2,585	2.533
DRUG PRESCRIPTIONS	5.761	7.748	6.523	7.460	6.791	6.968
SNF DAYS	0.217	0.458	1.285	0.937	0.705	0.766
ICF DAYS	3.091	1.282	1.885	2.659	1.963	2.147
TOTAL LTC DAYS	3.308	1.740	3.169	3.595	2.668	2.914
SNF % OF TOTAL LTC	6.549	26.316	40.534	26.049	26.427	26.303
HOME HEALTH VISITS	0.125	0.119	0.000	0.008	0.076	0.058
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	30.20	26.74	40.37	4.99	32.69	25.34
INPATIENT PHYSICIAN	22.58	15.39	10.13	6.38	15.24	12.89
OUTPATIENT	43.52	39.18	37.48	34.57	39.64	38.30
PRESCRIPTION DRUG	45.47	58.67	46.84	49.24	50.93	50.48
SNF	5.44	22.40	31.18	33.30	21.39	24.55
ICF	76.56	33.40	58.27	86.60	53.55	62.31
TOTAL LTC	82.00	55.80	89.45	119.90	74.94	86.87
SNF % OF TOTAL LTC	6.63	40.14	34.85	27.77	28.55	28.26
HOME HEALTH	3.02	4.54	0.00	0.30	2.47	1.89
TOTAL AFTERCARE	226.79	200.32	224.27	215.37	215.91	215.77

TABLE 7H

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CHRONIC PULMONARY HEART DISEASE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	5	12	11	8	28	36
PROBABILITY OF USE						
ANY SERVICE	1.000	1.000	1.000	0.750	1.000	0.944
INPATIENT HOSPITAL	0.000	0.250	0.455	0.125	0.286	0.250
INPATIENT SURGERY	0.000	0.000	0.091	0.000	0.036	0.028
OUTPATIENT PHYSICIAN	0.800	0.833	0.818	0.750	0.821	0.806
PRESCRIPTION DRUG	1.000	0.833	1.000	0.625	0.929	0.861
SNF	0.000	0.000	0.000	0.000	0.000	0.000
ICF	0.000	0.167	0.091	0.000	0.107	0.083
SNF OR ICF	0.000	0.167	0.091	0.000	0.107	0.083
HOME HEALTH	0.000	0.083	0.000	0.000	0.036	0.028
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.000	0.333	0.455	0.250	0.321	0.306
INPATIENT DAYS	0.000	3.000	5.364	2.000	3.393	3.083
INPATIENT SURGERIES	0.000	0.000	0.091	0.000	0.036	0.028
OUTPATIENT MD VISITS	2.800	2.750	3.273	1.875	2.964	2.722
DRUG PRESCRIPTIONS	14.400	10.333	9.364	10.625	10.679	10.667
SNF DAYS	0.000	0.000	0.000	0.000	0.000	0.000
ICF DAYS	0.000	8.250	3.776	0.000	5.019	3.904
TOTAL LTC DAYS	0.000	8.250	3.776	0.000	5.019	3.904
SNF % OF TOTAL LTC	.	0.000	0.000	.	0.000	0.000
HOME HEALTH VISITS	0.000	1.333	0.000	0.000	0.571	0.444
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	0.00	45.72	27.32	149.50	30.33	56.81
INPATIENT PHYSICIAN	25.65	23.09	35.44	12.73	28.40	24.92
OUTPATIENT	44.03	66.82	114.16	46.65	81.35	73.64
PRESCRIPTION DRUG	95.89	63.34	68.50	59.26	71.18	68.53
SNF	0.00	0.00	0.00	0.00	0.00	0.00
ICF	0.00	295.58	61.20	0.00	150.72	117.23
TOTAL LTC	0.00	295.58	61.20	0.00	150.72	117.23
SNF % OF TOTAL LTC	.	0.00	0.00	.	0.00	0.00
HOME HEALTH	0.00	36.28	0.00	0.00	15.55	12.09
TOTAL AFTERCARE	165.57	530.84	306.63	268.15	377.53	353.22

TABLE 7I

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: LENS EXTRACTION

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	323	589	648	491	1,560	2,051
PROBABILITY OF USE						
ANY SERVICE	0.975	0.969	0.978	0.986	0.974	0.977
INPATIENT HOSPITAL	0.043	0.046	0.039	0.033	0.042	0.040
INPATIENT SURGERY	0.015	0.008	0.011	0.006	0.011	0.010
OUTPATIENT PHYSICIAN	0.765	0.772	0.765	0.817	0.768	0.780
PRESCRIPTION DRUG	0.926	0.937	0.952	0.945	0.941	0.942
SNF	0.003	0.003	0.006	0.006	0.004	0.005
ICF	0.050	0.049	0.031	0.043	0.042	0.042
SNF OR ICF	0.050	0.053	0.037	0.045	0.046	0.045
HOME HEALTH	0.019	0.015	0.012	0.010	0.015	0.014
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.050	0.051	0.042	0.033	0.047	0.043
INPATIENT DAYS	0.635	0.472	0.301	0.204	0.435	0.379
INPATIENT SURGERIES	0.015	0.008	0.011	0.006	0.011	0.010
OUTPATIENT MD VISITS	1.938	2.192	2.276	2.379	2.174	2.223
DRUG PRESCRIPTIONS	7.786	7.913	7.761	8.589	7.824	8.007
SNF DAYS	0.096	0.203	0.296	0.169	0.220	0.208
ICF DAYS	2.068	2.364	1.615	1.921	1.992	1.975
TOTAL LTC DAYS	2.164	2.568	1.912	2.090	2.212	2.183
SNF % OF TOTAL LTC	4.435	7.918	15.499	8.088	9.934	9.511
HOME HEALTH VISITS	0.331	0.129	0.138	0.108	0.175	0.159
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	25.05	5.24	5.41	8.68	9.41	9.23
INPATIENT PHYSICIAN	10.22	11.06	12.46	12.09	11.47	11.62
OUTPATIENT	35.40	33.94	31.41	39.16	33.19	34.62
PRESCRIPTION DRUG	54.63	53.30	47.15	52.17	51.02	51.30
SNF	2.41	4.46	7.70	4.30	5.38	5.12
ICF	51.17	52.17	43.25	47.64	48.26	48.11
TOTAL LTC	53.59	56.63	50.95	51.95	53.64	53.23
SNF % OF TOTAL LTC	4.50	7.88	15.11	8.29	10.03	9.62
HOME HEALTH	10.90	3.44	4.09	3.60	5.26	4.86
TOTAL AFTERCARE	189.79	163.61	151.47	167.64	163.99	164.86

myocardial infarction. The fact that only the latter diagnosis follows the overall annual pattern found in Table 1C is somewhat surprising.

On the other hand, total aftercare expenditures are not always lowest in 1984, either. In fact, they are higher in 1984 than the average for 1981-83 for total hip replacement, inguinal hernia repair, acute myocardial infarction, and lens extraction. This means that at least one earlier year produced much lower expenditures than in 1984. This occurs not only for those four diagnoses, but also for pneumonia, transurethral prostatectomy, and chronic pulmonary heart disease. As with the peak years, these diagnoses differ in terms of the year in which total aftercare expenditures bottom out, with no meaningful pattern: 1981 for pneumonia, acute myocardial infarction, and chronic pulmonary heart disease; 1982 for inguinal hernia repair and transurethral prostatectomy; and 1983 for total hip replacement and lens extraction.

Differences among Diagnoses in Michigan's Pre/Post-PPS Patterns. A similarly mixed pattern of differences among the nine selected diagnoses in Michigan's non-nursing home population is evident in Tables 8A through 8I, which stratify the measures of aftercare utilization and expenditure by hospital-specific date of PPS implementation. Five of the diagnoses show a decline in expenditure in the post-PPS period: stroke, pneumonia, congestive heart failure, chronic pulmonary heart disease, and lens extraction. The remaining four diagnoses display an increase in expenditure following PPS implementation: total hip replacement, inguinal hernia repair, acute myocardial infarction, and transurethral prostatectomy. Again, no meaningful pattern can be discerned in these results.

Finally, it is instructive to examine the deviations of the detailed measures presented in Tables 8A through 8I from the overall pre/post-PPS pattern

TABLE 8A

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: STROKE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	1,357	302	1,659
PROBABILITY OF USE			
ANY SERVICE	0.982	0.980	0.982
INPATIENT HOSPITAL	0.140	0.076	0.128
INPATIENT SURGERY	0.028	0.003	0.024
OUTPATIENT PHYSICIAN	0.828	0.877	0.837
PRESCRIPTION DRUG	0.839	0.825	0.836
SNF	0.141	0.169	0.146
ICF	0.175	0.166	0.174
SNF OR ICF	0.281	0.298	0.284
HOME HEALTH	0.010	0.007	0.010
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.167	0.086	0.152
INPATIENT DAYS	2.442	1.172	2.211
INPATIENT SURGERIES	0.028	0.003	0.024
OUTPATIENT MD VISITS	4.281	4.616	4.342
DRUG PRESCRIPTIONS	7.401	7.270	7.379
SNF DAYS	4.383	4.915	4.480
ICF DAYS	6.310	5.409	6.146
TOTAL LTC DAYS	10.692	10.324	10.625
SNF % OF TOTAL LTC	40.989	47.605	42.160
HOME HEALTH VISITS	0.071	0.063	0.070
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	79.59	35.40	71.55
INPATIENT PHYSICIAN	31.28	17.27	28.73
OUTPATIENT	53.24	46.10	51.94
PRESCRIPTION DRUG	49.29	45.29	48.56
SNF	141.66	174.83	147.69
ICF	207.71	177.33	202.18
TOTAL LTC	349.36	352.16	349.87
SNF % OF TOTAL LTC	40.55	49.65	42.21
HOME HEALTH	2.38	2.46	2.40
TOTAL AFTERCARE	565.14	198.68	553.04

TABLE 8B

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: PNEUMONIA

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	1,774	375	2,149
PROBABILITY OF USE			
ANY SERVICE	0.984	0.989	0.985
INPATIENT HOSPITAL	0.130	0.101	0.125
INPATIENT SURGERY	0.015	0.011	0.014
OUTPATIENT PHYSICIAN	0.816	0.800	0.813
PRESCRIPTION DRUG	0.911	0.928	0.914
SNF	0.043	0.053	0.045
ICF	0.139	0.123	0.136
SNF OR ICF	0.167	0.171	0.168
HOME HEALTH	0.007	0.011	0.008
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.151	0.112	0.144
INPATIENT DAYS	1.700	1.451	1.656
INPATIENT SURGERIES	0.015	0.011	0.014
OUTPATIENT MD VISITS	3.248	2.933	3.193
DRUG PRESCRIPTIONS	7.860	8.365	7.948
SNF DAYS	1.242	1.497	1.286
ICF DAYS	6.259	5.984	6.211
TOTAL LTC DAYS	7.501	7.481	7.497
SNF % OF TOTAL LTC	16.554	20.007	17.155
HOME HEALTH VISITS	0.094	0.075	0.091
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	49.86	43.28	48.71
INPATIENT PHYSICIAN	25.82	17.34	24.34
OUTPATIENT	46.28	45.25	46.10
PRESCRIPTION DRUG	53.17	52.98	53.14
SNF	33.28	45.63	35.44
ICF	172.84	162.66	171.07
TOTAL LTC	206.12	208.29	206.50
SNF % OF TOTAL LTC	16.15	21.91	17.16
HOME HEALTH	3.41	2.23	3.21
TOTAL AFTERCARE	384.67	369.38	382.00

TABLE 8C

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: TOTAL HIP REPLACEMENT

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	161	34	195
PROBABILITY OF USE			
ANY SERVICE	0.994	1.000	0.995
INPATIENT HOSPITAL	0.068	0.029	0.062
INPATIENT SURGERY	0.019	0.000	0.015
OUTPATIENT PHYSICIAN	0.894	0.882	0.892
PRESCRIPTION DRUG	0.832	0.882	0.841
SNF	0.068	0.059	0.067
ICF	0.106	0.088	0.103
SNF OR ICF	0.137	0.147	0.138
HOME HEALTH	0.012	0.000	0.010
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.081	0.029	0.072
INPATIENT DAYS	1.236	0.382	1.087
INPATIENT SURGERIES	0.019	0.000	0.015
OUTPATIENT MD VISITS	2.509	2.706	2.544
DRUG PRESCRIPTIONS	6.043	7.706	6.333
SNF DAYS	1.298	1.912	1.405
ICF DAYS	3.360	3.206	3.333
TOTAL LTC DAYS	4.658	5.118	4.738
SNF % OF TOTAL LTC	27.867	37.356	29.654
HOME HEALTH VISITS	0.137	0.000	0.113
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	26.38	0.15	21.80
INPATIENT PHYSICIAN	10.71	12.43	11.01
OUTPATIENT	46.80	31.47	44.13
PRESCRIPTION DRUG	41.36	50.70	42.99
SNF	40.48	102.89	51.36
ICF	103.90	125.41	107.65
TOTAL LTC	144.38	228.30	159.01
SNF % OF TOTAL LTC	28.04	45.07	32.30
HOME HEALTH	3.93	0.00	3.25
TOTAL AFTERCARE	273.56	323.04	282.19

TABLE 8D

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: INGUINAL HERNIA REPAIR

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	286	54	340
PROBABILITY OF USE			
ANY SERVICE	0.934	0.944	0.935
INPATIENT HOSPITAL	0.049	0.037	0.047
INPATIENT SURGERY	0.021	0.000	0.018
OUTPATIENT PHYSICIAN	0.689	0.778	0.703
PRESCRIPTION DRUG	0.832	0.833	0.832
SNF	0.007	0.019	0.009
ICF	0.038	0.093	0.047
SNF OR ICF	0.045	0.111	0.056
HOME HEALTH	0.003	0.000	0.003
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.052	0.037	0.050
INPATIENT DAYS	0.521	0.185	0.468
INPATIENT SURGERIES	0.021	0.000	0.018
OUTPATIENT MD VISITS	1.773	2.907	1.953
DRUG PRESCRIPTIONS	5.108	4.333	4.985
SNF DAYS	0.290	1.111	0.421
ICF DAYS	1.742	4.315	2.151
TOTAL LTC DAYS	2.032	5.426	2.571
SNF % OF TOTAL LTC	14.279	20.478	16.356
HOME HEALTH VISITS	0.003	0.000	0.003
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	32.32	0.29	27.24
INPATIENT PHYSICIAN	7.74	4.27	7.19
OUTPATIENT	27.24	55.45	31.72
PRESCRIPTION DRUG	33.82	26.28	32.63
SNF	7.40	35.93	11.93
ICF	44.45	126.91	57.55
TOTAL LTC	51.85	162.84	69.48
SNF % OF TOTAL LTC	14.27	22.07	17.17
HOME HEALTH	0.16	0.00	0.13
TOTAL AFTERCARE	153.14	249.13	168.38

TABLE 8E

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CONGESTIVE HEART FAILURE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	3,063	638	3,701
PROBABILITY OF USE			
ANY SERVICE	0.986	0.987	0.986
INPATIENT HOSPITAL	0.163	0.124	0.156
INPATIENT SURGERY	0.015	0.005	0.014
OUTPATIENT PHYSICIAN	0.842	0.842	0.842
PRESCRIPTION DRUG	0.934	0.956	0.938
SNF	0.025	0.027	0.026
ICF	0.087	0.077	0.085
SNF OR ICF	0.105	0.092	0.103
HOME HEALTH	0.016	0.013	0.015
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.196	0.155	0.189
INPATIENT DAYS	2.255	1.453	2.117
INPATIENT SURGERIES	0.015	0.005	0.014
OUTPATIENT MD VISITS	3.808	3.826	3.811
DRUG PRESCRIPTIONS	10.572	11.723	10.770
SNF DAYS	0.741	0.773	0.747
ICF DAYS	3.734	3.186	3.640
TOTAL LTC DAYS	4.475	3.959	4.386
SNF % OF TOTAL LTC	16.564	19.528	17.025
HOME HEALTH VISITS	0.176	0.130	0.168
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	81.87	59.15	77.95
INPATIENT PHYSICIAN	25.68	14.86	23.81
OUTPATIENT	57.86	39.26	54.66
PRESCRIPTION DRUG	68.28	72.42	68.99
SNF	20.52	22.29	20.82
ICF	117.58	95.70	113.81
TOTAL LTC	138.10	117.99	134.63
SNF % OF TOTAL LTC	14.86	18.89	15.47
HOME HEALTH	4.24	3.33	4.09
TOTAL AFTERCARE	376.03	307.01	364.13

TABLE 8F

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: ACUTE MYOCARDIAL INFARCTION

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	819	171	990
PROBABILITY OF USE			
ANY SERVICE	0.974	0.977	0.975
INPATIENT HOSPITAL	0.140	0.117	0.136
INPATIENT SURGERY	0.016	0.006	0.014
OUTPATIENT PHYSICIAN	0.823	0.871	0.831
PRESCRIPTION DRUG	0.919	0.912	0.918
SNF	0.017	0.018	0.017
ICF	0.045	0.094	0.054
SNF OR ICF	0.056	0.111	0.066
HOME HEALTH	0.016	0.000	0.013
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.179	0.129	0.171
INPATIENT DAYS	1.882	0.825	1.699
INPATIENT SURGERIES	0.016	0.006	0.014
OUTPATIENT MD VISITS	3.739	5.281	4.005
DRUG PRESCRIPTIONS	10.656	11.058	10.725
SNF DAYS	0.621	0.234	0.554
ICF DAYS	1.653	3.485	1.970
TOTAL LTC DAYS	2.274	3.719	2.524
SNF % OF TOTAL LTC	27.306	6.290	21.957
HOME HEALTH VISITS	0.059	0.000	0.049
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	30.10	36.32	31.18
INPATIENT PHYSICIAN	24.70	17.56	23.46
OUTPATIENT	48.86	42.38	47.74
PRESCRIPTION DRUG	77.26	79.09	77.57
SNF	20.36	8.67	18.34
ICF	60.82	107.33	68.86
TOTAL LTC	81.18	116.00	87.20
SNF % OF TOTAL LTC	25.08	7.47	21.03
HOME HEALTH	2.23	0.00	1.84
TOTAL AFTERCARE	264.33	291.35	269.00

TABLE 8G

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: TRANSURETHRAL PROSTATECTOMY

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	378	97	475
PROBABILITY OF USE			
ANY SERVICE	0.981	0.990	0.983
INPATIENT HOSPITAL	0.085	0.041	0.076
INPATIENT SURGERY	0.029	0.021	0.027
OUTPATIENT PHYSICIAN	0.802	0.773	0.796
PRESCRIPTION DRUG	0.934	0.928	0.933
SNF	0.019	0.041	0.023
ICF	0.045	0.082	0.053
SNF OR ICF	0.056	0.113	0.067
HOME HEALTH	0.013	0.010	0.013
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.093	0.041	0.082
INPATIENT DAYS	1.122	0.433	0.981
INPATIENT SURGERIES	0.029	0.021	0.027
OUTPATIENT MD VISITS	2.693	1.907	2.533
DRUG PRESCRIPTIONS	6.910	7.196	6.968
SNF DAYS	0.651	1.216	0.766
ICF DAYS	1.812	3.454	2.147
TOTAL LTC DAYS	2.463	4.670	2.914
SNF % OF TOTAL LTC	26.427	26.049	26.303
HOME HEALTH VISITS	0.070	0.010	0.058
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	30.18	6.49	25.34
INPATIENT PHYSICIAN	14.51	6.59	12.89
OUTPATIENT	40.05	31.47	38.30
PRESCRIPTION DRUG	51.45	46.72	50.48
SNF	19.75	43.26	24.55
ICF	49.44	112.49	62.31
TOTAL LTC	69.19	155.74	86.87
SNF % OF TOTAL LTC	28.55	27.77	28.26
HOME HEALTH	2.28	0.38	1.89
TOTAL AFTERCARE	207.65	247.40	215.77

TABLE 8H

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CHRONIC PULMONARY HEART DISEASE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	30	6	36
PROBABILITY OF USE			
ANY SERVICE	1.000	0.667	0.944
INPATIENT HOSPITAL	0.267	0.167	0.250
INPATIENT SURGERY	0.033	0.000	0.028
OUTPATIENT PHYSICIAN	0.867	0.500	0.806
PRESCRIPTION DRUG	0.933	0.500	0.861
SNF	0.000	0.000	0.000
ICF	0.100	0.000	0.083
SNF OR ICF	0.100	0.000	0.083
HOME HEALTH	0.033	0.000	0.028
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.300	0.333	0.306
INPATIENT DAYS	3.167	2.667	3.083
INPATIENT SURGERIES	0.033	0.000	0.028
OUTPATIENT MD VISITS	2.833	2.167	2.722
DRUG PRESCRIPTIONS	12.233	2.833	10.667
SNF DAYS	0.000	0.000	0.000
ICF DAYS	4.684	0.000	3.904
TOTAL LTC DAYS	4.684	0.000	3.904
SNF % OF TOTAL LTC	0.000	.	0.000
HOME HEALTH VISITS	0.533	0.000	0.444
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	28.31	199.33	56.81
INPATIENT PHYSICIAN	26.80	15.50	24.92
OUTPATIENT	78.65	48.59	73.64
PRESCRIPTION DRUG	78.07	20.83	68.53
SNF	0.00	0.00	0.00
ICF	140.67	0.00	117.23
TOTAL LTC	140.67	0.00	117.23
SNF % OF TOTAL LTC	0.00	.	0.00
HOME HEALTH	14.51	0.00	12.09
TOTAL AFTERCARE	367.02	284.24	353.22

TABLE 8I

MICHIGAN: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: LENS EXTRACTION

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	1,677	368	2,045
PROBABILITY OF USE			
ANY SERVICE	0.976	0.984	0.977
INPATIENT HOSPITAL	0.039	0.038	0.039
INPATIENT SURGERY	0.010	0.008	0.009
OUTPATIENT PHYSICIAN	0.769	0.829	0.779
PRESCRIPTION DRUG	0.945	0.932	0.942
SNF	0.004	0.008	0.005
ICF	0.042	0.035	0.041
SNF OR ICF	0.046	0.038	0.044
HOME HEALTH	0.014	0.011	0.014
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.044	0.038	0.043
INPATIENT DAYS	0.390	0.228	0.361
INPATIENT SURGERIES	0.010	0.008	0.009
OUTPATIENT MD VISITS	2.160	2.505	2.222
DRUG PRESCRIPTIONS	7.878	8.571	8.002
SNF DAYS	0.204	0.226	0.208
ICF DAYS	2.040	1.488	1.941
TOTAL LTC DAYS	2.244	1.714	2.149
SNF % OF TOTAL LTC	9.106	13.162	9.688
HOME HEALTH VISITS	0.168	0.120	0.159
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	7.72	11.50	8.40
INPATIENT PHYSICIAN	11.36	12.50	11.56
OUTPATIENT	32.82	42.87	34.63
PRESCRIPTION DRUG	51.17	51.56	51.24
SNF	5.01	5.74	5.14
ICF	50.05	34.46	47.24
TOTAL LTC	55.05	40.20	52.38
SNF % OF TOTAL LTC	9.09	14.29	9.81
HOME HEALTH	5.09	3.90	4.87
TOTAL AFTERCARE	163.21	162.54	163.09

shown in Table 2C. The most frequent deviations occur in the categories of prescription drug and long-term care. At least one of the three prescription drug measures declines following PPS implementation (unlike in the overall results) for all of the diagnoses except total hip replacement and congestive heart failure. Similarly, at least one of the eight measures involving SNF care increases in the post-PPS period (only SNF expenditures and the SNF percentage of total long-term care days and dollars did so in the overall results) for all of the diagnoses except chronic pulmonary heart disease. A similar increase in at least one of the six measures involving ICF care is evident for all but congestive heart failure, chronic pulmonary heart disease, and lens extraction.

Also important are the diagnoses which display increases following PPS implementation (unlike in the overall results) in at least one of the four inpatient hospital measures: acute myocardial infarction, chronic pulmonary heart disease, and lens extraction. Finally, several diagnoses procuce increases in outpatient physician visits or expenditures. Indeed, only pneumonia, transurethral prostatectomy, and chronic pulmonary heart disease show no such increases. These nine selected diagnoses thus appear to differ somewhat from the total population of episodes, in that they generate more instances of increase in aftercare utilization from the pre-PPS period to the post-PPS period.

Annual Patterns by Nursing Home Residence in California. Table 9A presents for California the same annual averages of aftercare utilization and expenditure for 1981 through 1984 as were shown in Table 1A for Michigan. The overall number of episodes is far greater in California, due its much larger population. As in Michigan, the number of California episodes is higher in 1982 and 1983 than in 1981 or 1984, due to the use of a six-month precare period that eliminates episodes occurring in the first half of 1981, and a two-month aftercare period that eliminates episodes occurring in the last two months of 1984. The annualized number of episodes for 1981 is 149,130, very close to the number for 1982 (148,876). For 1984, however, the annualized number falls to 131,448 -- even lower than the 139,965 observed for 1983.

In both states, therefore, the annualized number of inpatient episodes is highest in the 1981-1982 period and falls thereafter. The overall proportional decline, however, is still larger in Michigan than in California (18.4% compared to 11.7%). Furthermore, Michigan's decline is more concentrated in the interval between 1983 and 1984, whereas California's is about evenly spread between the 1982-1983 interval and the 1983-1984 interval. On the other hand, as a percentage of all crossover stays in California (source given in Figure 5), 1984's number of episodes is very close to the numbers for 1982 and 1983 (all are around 70 percent), whereas 1981's number is substantially lower (about 56 percent).

In one very important respect, the annual results for California further corroborate those for Michigan. (In all of the following comparisons, keep in mind that inpatient surgeries and outpatient visits are not available for California, that the allocation between inpatient and outpatient physician services is biased toward the inpatient category, and that the SNF/ICF

TABLE 9A

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES

ALL EPISODES

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	74,565	148,886	139,965	109,540	363,406	472,946
PROBABILITY OF USE						
ANY SERVICE	0.959	0.944	0.927	0.939	0.940	0.940
INPATIENT HOSPITAL	0.074	0.080	0.077	0.063	0.078	0.074
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.861	0.717	0.636	0.701	0.715	0.712
PRESCRIPTION DRUG	0.820	0.817	0.791	0.807	0.808	0.808
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.126	0.134	0.128	0.121	0.130	0.128
HOME HEALTH	0.005	0.006	0.005	0.006	0.006	0.006
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.074	0.080	0.077	0.063	0.078	0.074
INPATIENT DAYS	0.957	1.078	0.967	0.739	1.010	0.947
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	5.044	5.037	4.419	4.696	4.801	4.776
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	0.183	0.205	0.183	0.187	0.192	0.191
TOTAL LTC DAYS	4.890	5.242	4.998	4.629	5.076	4.972
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.019	0.021	0.019	0.024	0.020	0.021
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	44.89	55.61	56.48	39.07	53.74	50.34
INPATIENT PHYSICIAN	53.59	18.95	18.65	14.95	25.94	23.40
OUTPATIENT	120.80	72.68	81.28	75.73	85.86	83.52
PRESCRIPTION DRUG	44.03	41.41	32.49	33.39	38.51	37.33
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	150.48	154.04	149.37	143.20	151.51	149.59
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.79	0.85	0.76	0.80	0.80	0.80
TOTAL AFTERCARE	414.58	343.54	339.02	307.13	356.38	344.97

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

distinction is meaningless in that state -- see the Methods section.) Almost all of the measures of aftercare utilization and expenditure are lower for 1984 than are the corresponding averages for the period of 1981 through 1983. The measures that deviate from this overall pattern, however, are not the same in the two states. Whereas Michigan's exceptions were generally found among certain outpatient physician, prescription drug, and SNF indicators, the only California measure that is higher in 1984 than in 1981-1983 is home health visits. Home health expenditures also show no difference between 1984 and 1981-1983.

Only one California measure adheres to the typical Michigan pattern of peaking in 1983 and then dropping sharply in 1984; but it is a rather important one: inpatient hospital expenditures. Indeed, in displaying the opposite pattern of reaching their lowest levels in 1983 and then jumping noticeably in 1984, several California measures tend to support the "quicker and sicker" hypothesis of the impact of Medicare PPS. These include all measures of prescription drug and home health utilization and expenditure, along with the probability of using outpatient physician services and the overall probability of using any health service.

Several other annual patterns emerge among certain other California indicators, however. Significantly, the most general measure, total aftercare expenditures (the last row in Table 9A), as well as inpatient physician expenditures continually decline throughout the entire four-year period, with the biggest drop occurring between 1981 and 1982. A more frequent pattern in the California results, however, is steady decrease from a peak in 1982. This applies to all nursing home measures and to the probability of an inpatient hospital stay. All of these patterns in which the level of aftercare

utilization is lower in 1984 than in the preceding years cast further doubt on the "quicker and sicker" hypothesis.

Finally, California shows much lower probabilities, utilization levels, and expenditures than does Michigan on all services except physician expenditures, both inpatient and outpatient. This finding is consistent with previous studies of regional variations in health-care utilization and expenditures, most notably an analysis of the crossover population (McMillan et al., 1983: 30-31).

Table 9B presents the California results for only those episodes in which the patient was a resident of a nursing home at the time of admission to the key inpatient hospital stay. The percentage of all episodes falling into this catgory is even lower in California than in Michigan: about four percent in 1981 through 1983, falling to 3.5 percent in 1984. Thus, to an even greater degree in California than in Michigan, the results for episodes in which the patient was not a nursing home resident, displayed in Table 9C, are virtually identical to those for all episodes (Table 9A).

Once again, the levels of utilization and expenditure for nursing home residents are almost always higher than for non-residents. The biggest difference, of course, is found in the nursing home measures. Exceptions to the overall pattern, however, occur for outpatient physician expenditures and number of home health visits. On both of these measures, nursing home residents show lower figures than do non-residents.

Intriguingly, nursing home residents generate more instances of decline in aftercare utilization throughout the entire four-year period (or at least after 1982), and fewer instances of an upturn in aftercare utilization in 1984, than do non-residents. This suggests that, despite implementation of PPS, aftercare utilization has declined even more substantially among nursing

TABLE 9B

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES

NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	2,954	5,909	5,628	3,797	14,491	18,288
PROBABILITY OF USE						
ANY SERVICE	0.955	0.961	0.955	0.950	0.957	0.956
INPATIENT HOSPITAL	0.089	0.111	0.100	0.072	0.102	0.096
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.873	0.734	0.642	0.727	0.727	0.727
PRESCRIPTION DRUG	0.839	0.832	0.822	0.809	0.829	0.825
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.863	0.860	0.827	0.821	0.847	0.842
HOME HEALTH	0.008	0.008	0.008	0.004	0.008	0.007
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.089	0.111	0.100	0.072	0.102	0.096
INPATIENT DAYS	1.362	1.740	1.413	0.958	1.536	1.416
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	7.310	7.146	6.276	6.237	6.841	6.716
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	1.850	1.837	1.589	1.737	1.743	1.742
TOTAL LTC DAYS	41.026	41.807	39.471	39.257	40.740	40.432
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.000	0.004	0.002	0.000	0.003	0.002
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	112.95	150.20	138.56	103.34	138.09	130.87
INPATIENT PHYSICIAN	59.20	24.89	17.85	16.48	29.15	26.52
OUTPATIENT	99.96	55.78	53.59	55.12	63.93	62.10
PRESCRIPTION DRUG	54.08	49.91	39.75	36.76	46.81	44.73
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	1124.49	1083.20	1039.56	1068.45	1074.67	1073.37
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	1.21	1.14	1.19	0.59	1.17	1.05
TOTAL AFTERCARE	1451.89	1365.12	1290.48	1280.74	1353.82	1338.65

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 9C

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES

NON-NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	71,611	142,967	134,337	105,743	348,915	454,658
PROBABILITY OF USE						
ANY SERVICE	0.959	0.943	0.925	0.938	0.940	0.939
INPATIENT HOSPITAL	0.074	0.079	0.076	0.063	0.077	0.074
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.861	0.716	0.635	0.700	0.715	0.711
PRESCRIPTION DRUG	0.819	0.816	0.790	0.807	0.807	0.807
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.096	0.104	0.098	0.096	0.100	0.099
HOME HEALTH	0.005	0.006	0.005	0.006	0.006	0.006
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.074	0.079	0.076	0.063	0.077	0.074
INPATIENT DAYS	0.940	1.051	0.948	0.731	0.988	0.928
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	4.951	4.950	4.342	4.641	4.716	4.698
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	0.114	0.137	0.125	0.131	0.128	0.128
TOTAL LTC DAYS	3.399	3.731	3.554	3.386	3.595	3.546
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.020	0.022	0.020	0.024	0.021	0.022
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	42.08	51.70	53.04	36.76	50.24	47.11
INPATIENT PHYSICIAN	53.36	18.71	18.68	14.90	25.81	23.27
OUTPATIENT	121.66	73.37	82.44	76.47	86.77	84.38
PRESCRIPTION DRUG	43.62	41.06	32.19	33.27	38.17	37.03
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	110.30	115.64	112.08	109.97	113.17	112.43
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.77	0.84	0.74	0.80	0.79	0.79
TOTAL AFTERCARE	371.79	301.32	299.16	272.17	314.95	305.00

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

home residents than among non-residents. Only the probability of using outpatient physician services shows an upturn in 1984 in both subpopulations. Also, nursing home residents apparently consumed even more nursing home care in 1984, whereas non-residents used more prescription drugs. Indeed, in addition to the probability of using outpatient physician services, the only measures on which the annual patterns for the two subpopulations of episodes are similar are the probability of using any service and the numbers of inpatient stays and days (peak in 1982), along with inpatient physician expenditures and total aftercare expenditures (decline throughout).

Pre/Post-PPS Patterns by Nursing Home Residence in California. Table 10A displays the various measures of aftercare utilization and expenditure for all California episodes, broken down by PPS status (pre-PPS vs. Post-PPS), based on each hospital's exact date of PPS implementation. As in Michigan, that date was not available for some hospitals, so that the episodes in which they were involved (10,323 in California) could not be included in this particular analysis. This slight change in the population of episodes causes some of the measures to show marginally different values for the entire period (the right-most column in the table) than they did in the annual analysis (Table 9A).

As in Michigan (Table 2A), most of the aftercare measures for California (Table 10A) show a substantial decline from the pre-PPS period to the post-PPS period. Considering the unavailability of several of the measures for California, the number of indicators showing an increase from pre- to post-PPS is about the same as in Michigan. The ones showing such an increase in both states are the prescription drug measures (except for expenditures in California) and the probability of using any service. Rather than the outpatient physician measures, however, California produces increases in home

TABLE 10A

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	349,074	68,549	462,623
PROBABILITY OF USE			
ANY SERVICE	0.940	0.941	0.940
INPATIENT HOSPITAL	0.077	0.060	0.074
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.712	0.706	0.711
PRESCRIPTION DRUG	0.808	0.813	0.809
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.129	0.124	0.128
HOME HEALTH	0.006	0.006	0.006
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.077	0.060	0.074
INPATIENT DAYS	0.985	0.689	0.941
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.778	4.785	4.779
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	5.016	4.803	4.984
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.020	0.027	0.021
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	51.71	36.25	49.42
INPATIENT PHYSICIAN	24.86	14.00	23.25
OUTPATIENT	84.15	74.69	82.75
PRESCRIPTION DRUG	37.89	33.74	37.28
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	150.06	145.49	149.38
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.79	0.92	0.81
TOTAL AFTERCARE	349.46	305.09	342.89

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

health visits and expenditures (and no change in the probability of using home health care). Any shift of inpatient services to other settings in California apparently did not include outpatient physician settings. Moreover, the increase in home health aftercare is basically insignificant, given the much smaller level of utilization of such care in California compared to Michigan. Thus, among all episodes, the only shift in service evident in California is away from most forms of institutional and outpatient care and toward prescription drug utilization (but not expenditures).

Tables 10B and 10C, which stratify California's aftercare measures by nursing home residence, reveal that any such shift is concentrated among nonresidents of nursing homes. As uusual, their results mirror almost exactly those for the entire population of episodes. But among nursing home residents, interestingly enough, the only measure that increases from the pre-PPS period to the post-PPS period is the probability of using outpatient physician services. Their utilization of all other types of aftercare decline noticeably, raising further questions about access to needed care for this vulnerable subpopulation.

TABLE 10B

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NURSING HOME RESIDENTS
PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	15,422	2,554	17,976
PROBABILITY OF USE			
ANY SERVICE	0.956	0.955	0.956
INPATIENT HOSPITAL	0.101	0.067	0.096
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.723	0.754	0.727
PRESCRIPTION DRUG	0.828	0.816	0.826
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.847	0.823	0.843
HOME HEALTH	0.008	0.005	0.007
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.101	0.067	0.096
INPATIENT DAYS	1.510	0.849	1.416
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	6.774	6.415	6.723
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	40.616	39.728	40.490
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.003	0.000	0.002
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	139.08	76.99	130.25
INPATIENT PHYSICIAN	28.12	16.81	26.51
OUTPATIENT	63.02	56.49	62.09
PRESCRIPTION DRUG	45.82	37.88	44.69
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	1070.28	1058.06	1068.55
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	1.12	0.78	1.07
TOTAL AFTERCARE	1347.43	1247.01	1333.16

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 10C

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	378,652	65,995	444,647
PROBABILITY OF USE			
ANY SERVICE	0.939	0.940	0.940
INPATIENT HOSPITAL	0.076	0.060	0.073
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.711	0.704	0.710
PRESCRIPTION DRUG	0.807	0.813	0.808
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.100	0.097	0.099
HOME HEALTH	0.005	0.006	0.006
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.076	0.060	0.073
INPATIENT DAYS	0.964	0.683	0.922
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.697	4.722	4.701
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	3.566	3.451	3.549
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.021	0.028	0.022
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	48.15	34.68	46.15
INPATIENT PHYSICIAN	24.73	13.89	23.12
OUTPATIENT	85.01	75.39	83.58
PRESCRIPTION DRUG	37.57	33.58	36.98
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	112.58	110.17	112.22
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.78	0.93	0.80
TOTAL AFTERCARE	308.82	268.64	302.85

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Aftercare Admissions and Complications in California. Paralleling Table 3A for Michigan, Table 11A displays the temporal distribution of aftercare inpatient readmissions and nursing home admissions for all California episodes for each year from 1981 through 1984. Again, the first such distribution is based on all episodes, and the other is based on only those episodes that had at least one such admission during the aftercare period. Also presented are the average length of stay (ALOS) of the inpatient readmissions and the rate of surgical complications, broken down by setting (inpatient, outpatient, and long-term care). For the specific foundations of this table, the reader is directed to the discussion of Table 3A.

Reflecting California's lower overall utilization levels for both inpatient hospital and nursing home services, the percentages in Table 11A are generally lower than those in Table 3A. As in Michigan, the temporal distributions for California shown in Table 11A remain fairly stable across the four years. Once again, however, the two states show somewhat different annual patterns. Rather than the gradual rise in the early years followed by a dropoff in 1984 evident in Michigan, the trend in California is one of general decline throughout the entire period. The slight shift across the four years toward later inpatient readmissions observed in Michigan is absent in California. No shift toward earlier readmissions is evident, either -- again failing to support the "quicker and sicker" hypothesis.

In keeping with numerous studies of regional variations in hospital utilization, California's ALOS is much lower than Michigan's in the period of 1981 through 1983, falling only slightly until it drops a bit more sharply in 1984. Intriguingly, however, by 1984 Michigan's ALOS has dipped below California's: 9.5 compared to 10.0. Apparently Michigan's initially higher ALOS had more room to respond to the various downward pressures than did

TABLE 11A

CALIFORNIA: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

ALL EPISODES

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	74,565	148,876	139,965	109,540	363,406	472,946
INPATIENT HOSPITAL						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	0.5	0.5	0.5	0.4	0.5	0.5
7 DAYS	1.8	2.6	1.8	1.5	2.1	2.0
14 DAYS	2.9	3.6	3.0	2.5	3.2	3.1
30 DAYS	4.7	5.4	4.9	4.1	5.0	4.8
60 DAYS	7.4	8.0	7.7	6.3	7.8	7.4
CUM % OF FIRST ADMISSIONS WITHIN:						
1 DAY	6.8	6.5	6.7	6.5	6.7	6.6
7 DAYS	23.6	31.8	23.5	23.3	27.0	26.3
14 DAYS	38.6	44.9	38.8	39.3	41.3	41.0
30 DAYS	62.5	67.4	63.1	64.2	64.8	64.7
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	10.9	10.8	10.8	10.0	10.8	10.7
NURSING HOME						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	5.6	5.9	5.8	5.4	5.8	5.7
7 DAYS	7.2	7.6	7.5	7.0	7.5	7.4
14 DAYS	8.4	9.0	9.0	8.5	8.9	8.8
30 DAYS	10.8	11.7	12.0	11.5	11.6	11.6
60 DAYS	12.5	13.4	13.6	13.0	13.3	13.2
CUM % OF ADMISSIONS WITHIN:						
1 DAY	44.8	44.5	43.0	41.6	44.0	43.5
7 DAYS	57.1	56.9	55.5	53.9	56.4	55.8
14 DAYS	66.9	67.4	66.7	65.3	67.0	66.6
30 DAYS	86.5	87.3	88.2	88.2	87.5	87.6
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
SURGICAL COMPLICATIONS						
INPATIENT COMPLICATIONS	2.4	3.0	3.2	3.8	3.0	3.2
OUTPATIENT COMPLICATIONS	4.9	5.2	6.0	5.3	5.4	5.4
LONG-TERM CARE COMPLICATNS	1.1	1.0	1.1	1.1	1.0	1.1
TOTAL COMPLICATIONS	8.4	9.2	10.3	10.2	9.5	9.6

California's already low figure. On the other hand, California's more noticeable drop in 1984 could well be largely due to the implementation of Medicare PPS.

California shows even stronger evidence than does Michigan of an increase over time in the rate of surgical complications, especially those associated with inpatient readmission. The rate of complications diagnosed in outpatient settings, as well as the overall rate for all settings, increases from 1981 through 1983, then falls back a bit. In Michigan, the overall rate fluctuated across the four years, ending in an increase in 1984, although the inpatient rate leveled off after climbing throughout the first three years. Again, the exact meaning of the California pattern is not self-evident. Although Medicare PPS appears to have slightly reduced the overall rate of surgical complications, a larger proportion of such complications apparently required rehospitalization.

Tables 11B and 11C stratify California's temporal distributions of inpatient readmissions and nursing home admissions during the aftercare period by nursing home residence. As in Michigan (Tables 3B and 3C), the patterns are not very different for nursing home residents and non-residents, except that (not surprisingly) the rate of aftercare nursing home admission in both states is much higher among residents than among non-residents. The annual patterns for both subpopulations in California generally follow those observed among the entire population of episodes, including the absence of any trend toward later admissions like the one found in Michigan. Also like the entire population, both subpopulations in California produce generally lower rates of inpatient readmission and nursing home admission in the aftercare period than do the subpopulations in Michigan.

TABLE 11B

CALIFORNIA: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	2,954	5,909	5,628	3,797	14,491	18,288
INPATIENT HOSPITAL						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	0.6	0.5	0.4	0.4	0.5	0.5
7 DAYS	2.3	4.5	2.2	1.3	3.2	2.8
14 DAYS	3.7	5.7	3.7	2.7	4.5	4.1
30 DAYS	5.8	7.9	6.3	4.6	6.8	6.4
60 DAYS	8.9	11.1	10.0	7.2	10.2	9.6
CUM % OF FIRST ADMISSIONS WITHIN:						
1 DAY	7.3	4.7	3.9	5.1	4.9	4.9
7 DAYS	26.0	40.2	22.3	18.3	30.9	28.9
14 DAYS	41.2	51.3	37.3	37.0	44.2	43.1
30 DAYS	64.9	71.1	62.7	63.7	66.8	66.3
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	12.7	11.6	12.4	11.8	12.1	12.0
NURSING HOME						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	54.3	54.7	54.4	54.0	54.5	54.4
7 DAYS	64.2	64.8	64.4	63.5	64.5	64.3
14 DAYS	70.5	71.3	71.8	71.1	71.3	71.3
30 DAYS	81.5	81.7	83.4	83.7	82.3	82.6
60 DAYS	85.7	85.7	86.6	86.8	86.1	86.2
CUM % OF ADMISSIONS WITHIN:						
1 DAY	63.3	63.8	62.8	62.3	63.3	63.1
7 DAYS	74.9	75.6	74.3	73.1	75.0	74.6
14 DAYS	82.2	83.2	82.9	81.9	82.9	82.7
30 DAYS	95.1	95.4	96.2	96.4	95.7	95.8
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
SURGICAL COMPLICATIONS						
INPATIENT COMPLICATIONS	2.7	4.1	3.4	3.7	3.5	3.6
OUTPATIENT COMPLICATIONS	3.0	4.4	5.9	4.7	4.7	4.7
LONG-TERM CARE COMPLICATNS	8.1	8.8	7.5	8.2	8.1	8.1
TOTAL COMPLICATIONS	13.9	17.3	16.7	16.6	16.4	16.4

TABLE 11C

CALIFORNIA: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

NON-NURSING HOME RESIDENTS

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	71,611	142,967	134,337	105,743	348,915	454,658
INPATIENT HOSPITAL						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	0.5	0.5	0.5	0.4	0.5	0.5
7 DAYS	1.7	2.5	1.8	1.5	2.1	1.9
14 DAYS	2.8	3.5	3.0	2.5	3.2	3.0
30 DAYS	4.6	5.3	4.8	4.1	5.0	4.8
60 DAYS	7.4	7.9	7.6	6.3	7.7	7.4
CUM % OF FIRST ADMISSIONS WITHIN:						
1 DAY	6.8	6.6	6.8	6.6	6.8	6.7
7 DAYS	23.5	31.3	23.6	23.5	26.8	26.2
14 DAYS	38.5	44.5	38.9	39.4	41.2	40.8
30 DAYS	62.4	67.2	63.1	64.2	64.7	64.6
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	10.8	10.8	10.8	10.0	10.8	10.6
NURSING HOME						
CUM % OF EPISODES WITH AN ADMISSION WITHIN:						
1 DAY	3.6	3.9	3.8	3.7	3.8	3.8
7 DAYS	4.8	5.2	5.1	5.0	5.1	5.1
14 DAYS	5.8	6.4	6.4	6.3	6.3	6.3
30 DAYS	7.9	8.8	9.0	8.9	8.7	8.7
60 DAYS	9.5	10.4	10.5	10.4	10.2	10.3
CUM % OF ADMISSIONS WITHIN:						
1 DAY	37.9	37.9	36.2	35.4	37.2	36.8
7 DAYS	50.5	50.5	49.0	48.1	49.9	49.5
14 DAYS	61.2	62.0	61.1	60.3	61.5	61.2
30 DAYS	83.3	84.5	85.4	85.8	84.6	84.9
60 DAYS	100.0	100.0	100.0	100.0	100.0	100.0
SURGICAL COMPLICATIONS						
INPATIENT COMPLICATIONS	2.4	3.0	3.2	3.8	2.9	3.2
OUTPATIENT COMPLICATIONS	5.0	5.2	5.0	5.3	5.5	5.4
LONG-TERM CARE COMPLICATNS	0.8	0.6	0.9	0.8	0.7	0.8
TOTAL COMPLICATIONS	8.2	8.9	10.0	10.0	9.2	9.4

On the other hand, inpatient ALOS among nursing home residents displays a more erratic pattern over the four-year period in California (Table 11B) than it did in Michigan (Table 3B). Although the rate is lower in 1984 than in the previous three-year period, it actually reaches its lowest point in 1982, followed by a prominent spike in 1983. The source of this aberration is not readily apparent. In Michigan, ALOS among nursing home residents as well as non-residents displayed the expected secular decline throughout the entire period, as do non-residents in California (Table 11C).

Interestingly, surgical complications among California's nursing home residents (Table 11B) show an annual pattern that is generally opposite to their pattern for ALOS. Most notably, the rate of complications that led to an inpatient readmission reaches its peak in 1982, then falls back in 1983 and finally rises a bit in 1984. The rate of total complications, on the other hand, continues to fall in 1984. The pattern for non-residents follows the pattern for the entire population of episodes in showing a steady increase over the four-year period in inpatient complications but a leveling off in 1984 of total complications. Both subpopulations mirror the total population of episodes in showing a substantial spike in outpatient complications in 1983, punctuating a gradual upward trend over the four-year period. Finally, in both subpopulations, complications diagnosed in long-term care settings show a more stable annual pattern in California than in Michigan.

Broken down by hospital-specific implementation of PPS in Table 12A, the temporal distributions of inpatient readmissions and nursing home admissions in the aftercare period among all California episodes are shown even more clearly to be highly similar in the pre-PPS and post-PPS eras. Once again, the slight shift to later inpatient readmissions observed in the Michigan data (Table 4A) is absent in these California results. Also more readily

TABLE 12A

CALIFORNIA: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS

PPS STATUS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	394,074	68,549	462,623
INPATIENT HOSPITAL			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	0.5	0.4	0.5
7 DAYS	2.0	1.4	1.9
14 DAYS	3.1	2.4	3.0
30 DAYS	5.0	3.9	4.8
60 DAYS	7.7	6.0	7.4
CUM % OF FIRST ADMISSIONS WITHIN:			
1 DAY	6.4	6.8	6.5
7 DAYS	26.4	23.9	26.1
14 DAYS	41.0	40.5	40.9
30 DAYS	64.8	64.5	64.7
60 DAYS	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	10.7	10.0	10.6
NURSING HOME			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	5.8	5.8	5.8
7 DAYS	7.4	7.3	7.4
14 DAYS	8.8	8.8	8.8
30 DAYS	11.6	11.8	11.6
60 DAYS	13.2	13.4	13.2
CUM % OF ADMISSIONS WITHIN:			
1 DAY	43.5	43.1	43.4
7 DAYS	55.9	55.0	55.8
14 DAYS	66.7	66.0	66.6
30 DAYS	87.5	88.7	87.7
60 DAYS	100.0	100.0	100.0
SURGICAL COMPLICATIONS			
INPATIENT COMPLICATIONS	3.1	3.6	3.2
OUTPATIENT COMPLICATIONS	5.4	5.3	5.4
LONG-TERM CARE COMPLICATIONS	1.1	1.1	1.1
TOTAL COMPLICATIONS	9.5	9.9	9.6

apparent are the drop in California's inpatient ALOS and the rise in surgical complications, both overall and in inpatient settings, although outpatient complications decline slightly. In the Michigan results it was outpatient rather than inpatient complications that increased.

As usual, the results for non-residents of nursing homes, presented in Table 12C, are virtually identical to those for the entire population of episodes. On the other hand, the results for nursing home residents, shown in Table 12B, do uncover some evidence of a shift toward later inpatient readmissions, but it is by no means overwhelming. The cumulative percentages of first readmissions within all intervals are lower in the post-PPS period than in the pre-PPS period, indicating that more of them are concentrated in the remaining interval between 30 and 60 days of discharge.

TABLE 12B

CALIFORNIA: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS
PPS STATUS
NURSING HOME RESIDENTS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	15,422	2,554	17,976
INPATIENT HOSPITAL			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	0.5	0.4	0.5
7 DAYS	3.0	1.2	2.8
14 DAYS	4.4	2.3	4.1
30 DAYS	6.7	4.0	6.4
60 DAYS	10.1	6.7	9.6
CUM % OF FIRST ADMISSIONS WITHIN:			
1 DAY	4.6	6.4	4.8
7 DAYS	30.0	18.1	28.8
14 DAYS	44.1	33.9	43.1
30 DAYS	67.1	59.6	66.3
60 DAYS	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	12.1	11.2	12.0
NURSING HOME			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	54.2	56.0	54.5
7 DAYS	64.2	65.5	64.4
14 DAYS	71.2	72.6	71.4
30 DAYS	82.4	84.3	82.7
60 DAYS	86.1	87.3	86.3
CUM % OF ADMISSIONS WITHIN:			
1 DAY	63.0	64.1	63.1
7 DAYS	74.5	75.0	74.6
14 DAYS	82.6	83.1	82.7
30 DAYS	95.7	96.6	95.8
60 DAYS	100.0	100.0	100.0
SURGICAL COMPLICATIONS			
INPATIENT COMPLICATIONS	3.6	3.5	3.6
OUTPATIENT COMPLICATIONS	4.4	7.0	4.8
LONG-TERM CARE COMPLICATIONS	8.2	8.6	8.3
TOTAL COMPLICATIONS	16.3	19.2	16.7

TABLE 12C

CALIFORNIA: AFTERCARE PERIOD
HOSPITAL AND NURSING HOME ADMISSIONS
AND SURGICAL COMPLICATIONS
PPS STATUS
NON-NURSING HOME RESIDENTS

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	378,652	65,995	444,647
INPATIENT HOSPITAL			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	0.5	0.4	0.5
7 DAYS	2.0	1.4	1.9
14 DAYS	3.1	2.4	3.0
30 DAYS	4.9	3.9	4.8
60 DAYS	7.6	6.0	7.3
CUM % OF FIRST ADMISSIONS WITHIN:			
1 DAY	6.5	6.8	6.6
7 DAYS	26.2	24.1	26.0
14 DAYS	40.8	40.8	40.8
30 DAYS	64.6	64.7	64.6
60 DAYS	100.0	100.0	100.0
AVERAGE LENGTH OF STAY	10.7	9.9	10.6
NURSING HOME			
CUM % OF EPISODES WITH AN ADMISSION WITHIN:			
1 DAY	3.8	3.8	3.8
7 DAYS	5.1	5.1	5.1
14 DAYS	6.3	6.3	6.3
30 DAYS	8.7	9.0	8.7
60 DAYS	10.3	10.5	10.3
CUM % OF ADMISSIONS WITHIN:			
1 DAY	36.8	36.3	36.7
7 DAYS	49.6	48.5	49.4
14 DAYS	61.3	60.5	61.2
30 DAYS	84.7	86.2	84.9
60 DAYS	100.0	100.0	100.0
SURGICAL COMPLICATIONS			
INPATIENT COMPLICATIONS	3.1	3.6	3.1
OUTPATIENT COMPLICATIONS	5.4	5.2	5.4
LONG-TERM CARE COMPLICATIONS	0.8	0.8	0.8
TOTAL COMPLICATIONS	9.3	9.5	9.3

Age Differences in California's Annual Patterns. Tables 13A through 13D for California correspond to Tables 5A through 5D for Michigan in presenting the various measures of aftercare utilization and expenditure broken down by age group. Again, these tables are based only on episodes involving non-residents of nursing homes in order to control for the effects of nursing home residence while maintaining a sufficient number of cases in each of the four age groups. Compared to Michigan, a much smaller proportion of the total population of episodes in California had missing data on patient date of birth, hence age: 18,298 out of 472,946, or only about four percent, compared to 32 percent in Michigan. Following the reasoning outlined in conjunction with Tables 5A through 5D, this means that the bias towards younger, disabled enrollees in these tables is far less serious for California than for Michigan.

Although they may be a partial consequence of this difference in composition, some interesting contrasts emerge between the two states in their levels of aftercare utilization broken down by age group. Focusing on the averages for the entire four-year period (the last column in each of the relevant tables), the only pattern common to both states is that all nursing home measures increase with age, as would be expected. Total aftercare expenditures and the probability of using any service also increase with age in Michigan.

In California, however, total aftercare expenditures are almost as high in the under 65 age group (Table 13A) as in the 85 and over age group (Table 13D), and they are lowest in the 65 to 74 age group (Table 13B). In addition, most other non-LTC measures actually decline with age in California. In Michigan, most of the inpatient, outpatient, and prescription drug measures are highest in the 65 to 74 age group (Table 5B). In those non-LTC

TABLE 13A

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
< 65 YEARS OF AGE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	15,745	29,095	26,452	20,244	71,292	91,536
PROBABILITY OF USE						
ANY SERVICE	0.962	0.949	0.935	0.949	0.947	0.947
INPATIENT HOSPITAL	0.089	0.094	0.089	0.077	0.091	0.088
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.875	0.761	0.697	0.752	0.762	0.760
PRESCRIPTION DRUG	0.834	0.826	0.800	0.829	0.818	0.820
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.040	0.046	0.045	0.045	0.044	0.044
HOME HEALTH	0.004	0.005	0.004	0.005	0.005	0.005
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.089	0.094	0.089	0.077	0.091	0.088
INPATIENT DAYS	1.105	1.208	1.103	0.917	1.146	1.096
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	5.562	5.524	4.852	5.302	5.283	5.287
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	1.385	1.521	1.571	1.527	1.510	1.514
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.024	0.027	0.019	0.022	0.023	0.023
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	63.16	66.75	74.06	48.43	68.67	64.19
INPATIENT PHYSICIAN	65.91	29.52	34.75	24.21	39.49	36.11
OUTPATIENT	168.20	122.80	158.59	127.63	146.11	142.02
PRESCRIPTION DRUG	52.57	50.17	40.29	43.68	47.03	46.29
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	45.68	48.78	53.45	54.78	49.83	50.92
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.83	0.87	0.57	0.66	0.75	0.73
TOTAL AFTERCARE	396.36	318.88	361.70	299.38	351.88	340.27

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 13B

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
65 - 74 YEARS OF AGE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	24,000	46,505	42,653	32,850	113,158	146,008
PROBABILITY OF USE						
ANY SERVICE	0.960	0.945	0.929	0.939	0.942	0.941
INPATIENT HOSPITAL	0.076	0.083	0.080	0.070	0.080	0.078
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.861	0.721	0.651	0.707	0.724	0.720
PRESCRIPTION DRUG	0.823	0.825	0.804	0.818	0.816	0.817
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.071	0.074	0.069	0.065	0.071	0.070
HOME HEALTH	0.005	0.005	0.005	0.005	0.005	0.005
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.076	0.083	0.080	0.070	0.080	0.078
INPATIENT DAYS	0.946	1.078	0.989	0.803	1.017	0.969
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	5.062	5.112	4.596	4.899	4.907	4.905
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	2.383	2.592	2.375	2.195	2.466	2.405
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.022	0.021	0.020	0.027	0.021	0.022
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	43.18	56.74	57.05	44.73	53.98	51.90
INPATIENT PHYSICIAN	54.18	18.77	20.14	15.74	26.80	24.31
OUTPATIENT	121.05	75.51	86.66	78.59	89.37	86.94
PRESCRIPTION DRUG	45.32	43.25	34.64	35.85	40.44	39.41
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	78.08	80.78	75.21	72.06	78.11	76.75
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.74	0.71	0.71	0.76	0.72	0.73
TOTAL AFTERCARE	342.55	275.75	274.41	247.73	289.41	280.04

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 13C

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
75 - 84 YEARS OF AGE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	21,935	45,084	42,692	33,630	109,711	143,341
PROBABILITY OF USE						
ANY SERVICE	0.959	0.940	0.921	0.937	0.936	0.937
INPATIENT HOSPITAL	0.066	0.071	0.071	0.056	0.070	0.067
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.857	0.695	0.604	0.682	0.692	0.689
PRESCRIPTION DRUG	0.812	0.810	0.785	0.802	0.801	0.801
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.124	0.128	0.118	0.114	0.123	0.121
HOME HEALTH	0.006	0.006	0.006	0.006	0.006	0.006
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.066	0.071	0.071	0.056	0.070	0.067
INPATIENT DAYS	0.871	0.972	0.882	0.637	0.917	0.851
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	4.607	4.659	4.051	4.360	4.412	4.400
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	4.408	4.557	4.251	3.985	4.408	4.309
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.014	0.022	0.018	0.026	0.019	0.020
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	30.43	44.49	46.39	30.77	42.42	39.69
INPATIENT PHYSICIAN	47.32	14.31	12.05	11.12	20.03	17.94
OUTPATIENT	102.66	52.63	51.48	57.93	62.18	61.19
PRESCRIPTION DRUG	38.67	36.65	28.31	29.11	33.81	32.70
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	142.49	140.73	133.78	128.26	138.38	136.01
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.65	0.90	0.75	0.88	0.79	0.81
TOTAL AFTERCARE	362.23	289.70	272.76	258.08	297.61	288.33

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 13D

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
85 YEARS OF AGE OR OLDER

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	9,921	22,283	22,540	19,019	54,744	73,763
PROBABILITY OF USE						
ANY SERVICE	0.957	0.940	0.915	0.928	0.933	0.932
INPATIENT HOSPITAL	0.061	0.068	0.063	0.050	0.065	0.061
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.848	0.690	0.594	0.666	0.679	0.676
PRESCRIPTION DRUG	0.802	0.798	0.762	0.776	0.784	0.782
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.182	0.196	0.179	0.174	0.187	0.183
HOME HEALTH	0.007	0.008	0.007	0.007	0.008	0.007
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.061	0.068	0.063	0.050	0.065	0.061
INPATIENT DAYS	0.817	0.748	0.313	0.573	0.869	0.792
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	4.473	4.450	3.812	3.987	4.192	4.139
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	6.802	7.321	6.788	6.362	7.007	6.841
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.021	0.018	0.024	0.022	0.021	0.021
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	31.75	36.13	33.36	21.15	34.20	30.83
INPATIENT PHYSICIAN	44.85	13.34	9.63	10.21	17.52	15.64
OUTPATIENT	91.36	46.37	43.71	51.12	53.43	52.83
PRESCRIPTION DRUG	36.26	33.52	25.40	25.07	30.67	29.23
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	218.92	224.94	209.54	201.87	217.51	213.47
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.99	0.96	0.96	0.89	0.97	0.95
TOTAL AFTERCARE	424.13	355.26	322.59	310.30	354.29	342.95

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

categories in Michigan, the utilization and expenditure measures tend to be lowest in the 85 and over age group, but the probability measures tend to be lowest in the under 65 age group. Finally, the home health measures are generally higher in the youngest and oldest age groups (and lower in the middle age groups) in Michigan, whereas in California they tend to increase with age.

The two states also differ somewhat in the extent to which their age-specific annual patterns of aftercare utilization conform to those for the entire population of episodes. In Michigan, deviations from the state's overall pattern were most frequent in the youngest (Table 5A) as well as the oldest (Table 5D) age groups, but California's deviations tend to be concentrated in the latter (Table 13D). All four California age groups produce a deviant pattern on at least one physician expenditure measure, and at least one home health measure generates a deviant pattern in every age group except the youngest (Table 13A). In addition to most of these measures, the oldest age group (Table 13D) also generates a deviant annual pattern on inpatient expenditures.

Again, however, no consistent pattern in California's deviations is readily discernible. As in Michigan, they tend to take the form of only slightly earlier or later peaks in the annual trends for the specific age group, compared to the total population of episodes. The most noteworthy deviations for California are a continual increase in nursing home expenditures across the four years in the under 65 age group (Table 13A), but a continual decline in such expenditures in the 65 to 74 age group (Table 13C). In the total population of episodes (Table 9A), nursing home expenditures peaked in 1982. In addition, the 85 and over age group shows a steady decline in home health expenditures (Table 13D), whereas the total population of episodes displayed

a slight upturn in such expenditures in 1984. The reasons for these deviations are not entirely clear.

Age Differences in California's Pre/Post-PPS Patterns. Tables 14A through 14D stratify California's aftercare measures for the four age groups among non-nursing home residents by hospital-specific implementation of PPS rather than by year. Again, some additional episodes were lost to this analysis because the PPS implementation dates of their hospitals were missing, so that some of the averages for the entire period will differ from those reported in the annual results. As in the Michigan results (Tables 6A through 6D), the number of deviations of the patterns in these tables from those found among all episodes involving non-nursing home residents (Table 10C) is somewhat lower, and the specific measures that deviate are often different from those found in the annual analysis (Tables 13A through 13D).

In California's under 65 age group (Table 14A), all three of the nursing home measures increase from the pre-PPS period to the post-PPS period, in contrast to the decline observed in the overall results (Table 10C). The other deviations for this age group are the decrease in home health visits and expenditures, rather than the increase found among all episodes. The patterns of change from pre- to post-PPS for the 65 to 74 age group (Table 14B), on the other hand, conform exactly to those produced by the entire population of episodes.

The results for the 75 to 84 age group (Table 14C), however, do yield some deviations from the overall patterns, namely no change from the pre-PPS period to the post-PPS period in the overall probability of using any service and in the probability of using outpatient physician services, as well as a small decrease in the number of drug prescriptions. The overall results (Table 10C) showed opposite patterns on those two measures. Finally, far

TABLE 14A

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
< 65 YEARS OF AGE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	75,618	12,396	88,014
PROBABILITY OF USE			
ANY SERVICE	0.947	0.952	0.948
INPATIENT HOSPITAL	0.090	0.075	0.088
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.760	0.749	0.759
PRESCRIPTION DRUG	0.820	0.839	0.823
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.044	0.045	0.044
HOME HEALTH	0.005	0.005	0.005
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.090	0.075	0.088
INPATIENT DAYS	1.120	0.891	1.088
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	5.290	5.416	5.308
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	1.490	1.524	1.494
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.024	0.022	0.024
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	62.26	62.45	62.29
INPATIENT PHYSICIAN	38.20	22.61	36.01
OUTPATIENT	143.38	126.08	140.95
PRESCRIPTION DRUG	46.78	43.30	46.29
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	49.79	51.10	49.98
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.75	0.65	0.74
TOTAL AFTERCARE	341.18	306.20	336.26

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 14B

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
65 - 74 YEARS OF AGE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	122,043	20,589	142,632
PROBABILITY OF USE			
ANY SERVICE	0.941	0.942	0.941
INPATIENT HOSPITAL	0.080	0.064	0.078
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.721	0.708	0.719
PRESCRIPTION DRUG	0.817	0.824	0.818
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.070	0.065	0.070
HOME HEALTH	0.005	0.006	0.005
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.080	0.064	0.078
INPATIENT DAYS	1.009	0.718	0.967
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.890	5.023	4.910
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	2.425	2.258	2.401
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.021	0.034	0.023
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	54.05	34.63	51.24
INPATIENT PHYSICIAN	25.89	14.27	24.21
OUTPATIENT	87.82	76.88	86.24
PRESCRIPTION DRUG	39.89	36.61	39.41
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	77.21	71.81	76.43
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.70	0.97	0.74
TOTAL AFTERCARE	285.55	235.16	278.27

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 14C

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
75 - 84 YEARS OF AGE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	120,047	21,170	141,217
PROBABILITY OF USE			
ANY SERVICE	0.937	0.937	0.937
INPATIENT HOSPITAL	0.069	0.054	0.067
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.689	0.689	0.689
PRESCRIPTION DRUG	0.801	0.805	0.802
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.122	0.113	0.121
HOME HEALTH	0.006	0.007	0.006
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.069	0.054	0.067
INPATIENT DAYS	0.887	0.609	0.845
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.400	4.397	4.400
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	4.357	3.954	4.297
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.019	0.028	0.021
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	40.90	28.66	39.07
INPATIENT PHYSICIAN	19.13	10.85	17.89
OUTPATIENT	61.64	57.84	61.07
PRESCRIPTION DRUG	33.27	29.53	32.71
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	137.15	125.53	135.41
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.79	1.00	0.82
TOTAL AFTERCARE	292.88	253.41	286.96

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 14D

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
85 YEARS OF AGE OR OVER

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	60,934	11,840	72,774
PROBABILITY OF USE			
ANY SERVICE	0.932	0.931	0.932
INPATIENT HOSPITAL	0.064	0.046	0.061
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.675	0.676	0.675
PRESCRIPTION DRUG	0.783	0.779	0.782
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.184	0.181	0.183
HOME HEALTH	0.007	0.008	0.007
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.064	0.046	0.061
INPATIENT DAYS	0.834	0.534	0.785
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.157	4.055	4.140
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	6.863	6.643	6.827
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.021	0.025	0.021
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	33.10	16.44	30.39
INPATIENT PHYSICIAN	16.73	9.52	15.55
OUTPATIENT	53.00	51.14	52.69
PRESCRIPTION DRUG	29.98	25.36	29.23
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	212.83	211.26	212.57
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.94	1.02	0.96
TOTAL AFTERCARE	346.57	314.74	341.39

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

fewer deviations from the overall pattern occur in the pre/post-PPS results (Table 14D) than in the annual results (Table 13D) for the 85 and over age group. The only overlap in the measures that deviate in the two sets of results is in the probability of using home health services, which basically shows no change at all over time. Additionally, in the pre/post-PPS results the probability of using any service declines a bit and the probability of using outpatient physician services increases by an only slightly larger amount, but the number of drug prescriptions declines more noticeably. The overall results (Table 10C) showed opposite patterns on these measures.

Again, no explanations are available for these patterns of deviation, but the overall message in these tables is quite clear: On most measures, Medicaid-funded aftercare utilization and expenditure among California crossover recipients declined substantially in all age groups from the pre-PPS period to the post-PPS period. The measures that occasionally show increases between the two periods occur in the home health, prescription drug, and outpatient physician categories.

Differences among Diagnoses in California's Annual Patterns. The annual patterns of aftercare utilization and expenditure for all California episodes that involved one of nine selected key-stay diagnoses (see Figure 2) among non-nursing home residents are presented in Tables 15A through 15I. Unfortunately, due to the absence of procedure codes in the California Tape-to-Tape data, results are not available for the four selected "diagnoses" that are actually based on procedure codes: total hip replacement, inguinal hernia repair, transurethral prostatectomy, and lens extraction. To maintain parallel table numbers with the Michigan results (Tables 7A through 7I), blank tables have been inserted for those procedure-based "diagnoses" (Tables 15C, 15D, 15G, and 15I).

TABLE 15A

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: STROKE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	2,027	4,464	4,368	3,730	10,859	14,589
PROBABILITY OF USE						
ANY SERVICE	0.938	0.932	0.908	0.916	0.923	0.922
INPATIENT HOSPITAL	0.088	0.100	0.093	0.064	0.095	0.087
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.843	0.703	0.623	0.691	0.697	0.695
PRESCRIPTION DRUG	0.733	0.727	0.699	0.712	0.717	0.715
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.227	0.227	0.197	0.183	0.215	0.207
HOME HEALTH	0.014	0.017	0.012	0.010	0.014	0.013
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.088	0.100	0.093	0.064	0.095	0.087
INPATIENT DAYS	1.368	1.848	1.524	0.995	1.628	1.466
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	4.164	3.897	3.420	3.603	3.755	3.716
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	7.660	7.805	6.596	5.744	7.292	6.896
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.005	0.022	0.018	0.004	0.017	0.014
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	44.62	79.68	68.27	39.88	68.54	61.22
INPATIENT PHYSICIAN	55.19	16.72	14.34	13.12	22.94	20.43
OUTPATIENT	114.00	55.25	52.65	58.98	65.17	63.59
PRESCRIPTION DRUG	34.66	30.30	23.80	24.07	28.50	27.37
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	269.03	263.58	233.26	199.05	252.40	238.76
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	1.46	2.11	1.62	1.11	1.79	1.62
TOTAL AFTERCARE	518.96	447.63	393.94	336.22	439.35	412.98

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 15B

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: PNEUMONIA

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	1,745	4,345	4,467	3,731	10,557	14,288
PROBABILITY OF USE						
ANY SERVICE	0.949	0.935	0.917	0.932	0.930	0.930
INPATIENT HOSPITAL	0.069	0.077	0.073	0.055	0.074	0.069
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.849	0.706	0.634	0.699	0.699	0.699
PRESCRIPTION DRUG	0.794	0.783	0.771	0.782	0.780	0.781
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.136	0.142	0.152	0.143	0.145	0.145
HOME HEALTH	0.003	0.005	0.004	0.005	0.005	0.005
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.069	0.077	0.073	0.055	0.074	0.069
INPATIENT DAYS	0.983	1.050	0.931	0.668	0.988	0.905
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	5.152	5.019	4.235	4.557	4.709	4.670
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	5.465	5.603	6.207	5.431	5.836	5.730
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.010	0.055	0.039	0.030	0.041	0.038
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	76.41	62.43	56.04	36.05	62.03	55.25
INPATIENT PHYSICIAN	45.65	18.08	15.49	12.15	21.54	19.09
OUTPATIENT	102.22	58.58	61.87	63.71	67.19	66.28
PRESCRIPTION DRUG	41.54	39.19	29.68	30.56	35.55	34.25
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	149.28	149.75	170.08	164.89	158.27	160.00
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.39	1.27	1.05	0.85	1.03	0.98
TOTAL AFTERCARE	415.49	329.30	334.20	308.20	345.62	335.85

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Table 15C

Total Hip Replacement

NOT AVAILABLE FOR CALIFORNIA

Table 15D

Ingunial Hernia Repair

NOT AVAILABLE FOR CALIFORNIA

TABLE 15E

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CONGESTIVE HEART FAILURE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	3,062	6,722	6,195	5,267	15,979	21,246
PROBABILITY OF USE						
ANY SERVICE	0.965	0.956	0.949	0.953	0.955	0.955
INPATIENT HOSPITAL	0.087	0.085	0.089	0.071	0.087	0.083
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.868	0.750	0.656	0.728	0.736	0.734
PRESCRIPTION DRUG	0.852	0.860	0.846	0.870	0.853	0.858
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.107	0.110	0.111	0.098	0.110	0.107
HOME HEALTH	0.006	0.005	0.004	0.006	0.005	0.005
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.087	0.085	0.089	0.071	0.087	0.083
INPATIENT DAYS	1.072	1.067	1.156	0.741	1.102	1.013
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	6.319	6.240	5.572	5.938	5.996	5.982
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	3.621	3.701	3.730	3.279	3.697	3.593
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.024	0.019	0.021	0.039	0.021	0.025
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	52.04	62.80	69.40	57.26	63.30	61.80
INPATIENT PHYSICIAN	49.91	18.21	19.35	14.27	24.73	22.13
OUTPATIENT	121.20	68.00	76.17	71.02	81.36	78.80
PRESCRIPTION DRUG	52.18	46.95	36.34	36.61	43.84	42.05
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	120.17	119.19	118.95	104.21	119.28	115.55
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.81	0.74	0.69	1.06	0.73	0.81
TOTAL AFTERCARE	396.32	315.90	320.90	284.42	333.25	321.14

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 15F

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: ACUTE MYOCARDIAL INFARCTION

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	1,391	2,843	2,676	2,263	6,910	9,173
PROBABILITY OF USE						
ANY SERVICE	0.943	0.927	0.903	0.913	0.921	0.919
INPATIENT HOSPITAL	0.076	0.083	0.084	0.078	0.082	0.081
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.794	0.662	0.575	0.653	0.655	0.654
PRESCRIPTION DRUG	0.776	0.766	0.739	0.771	0.757	0.761
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.053	0.065	0.058	0.059	0.060	0.060
HOME HEALTH	0.003	0.003	0.002	0.007	0.003	0.004
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.076	0.083	0.084	0.078	0.082	0.081
INPATIENT DAYS	0.835	0.937	0.864	0.789	0.888	0.864
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	5.204	5.036	4.402	4.945	4.824	4.854
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	1.737	2.036	1.768	1.939	1.872	1.889
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.037	0.005	0.012	0.014	0.014	0.014
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	37.74	40.25	35.11	27.49	37.76	35.22
INPATIENT PHYSICIAN	69.81	17.83	20.35	15.30	29.27	25.82
OUTPATIENT	96.88	55.11	51.11	52.40	61.97	59.61
PRESCRIPTION DRUG	42.28	39.12	30.01	32.11	36.23	35.21
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	56.16	68.94	58.01	62.88	62.14	62.32
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.93	0.28	0.47	0.46	0.49	0.48
TOTAL AFTERCARE	303.80	221.53	195.06	190.65	227.84	218.67

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Table 15G

Transurethral Prostatectomy

NOT AVAILABLE FOR CALIFORNIA

TABLE 15H

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CHRONIC PULMONARY HEART DISEASE

	1981	1982	1983	1984	1981-83	1981-84
NUMBER OF EPISODES	65	98	54	55	217	272
PROBABILITY OF USE						
ANY SERVICE	0.954	0.929	0.963	0.945	0.945	0.945
INPATIENT HOSPITAL	0.108	0.071	0.148	0.109	0.101	0.103
INPATIENT SURGERY*	.	.	.	.	.	.
OUTPATIENT PHYSICIAN	0.815	0.755	0.667	0.727	0.751	0.746
PRESCRIPTION DRUG	0.723	0.755	0.815	0.855	0.760	0.779
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
SNF OR ICF	0.092	0.061	0.019	0.091	0.060	0.066
HOME HEALTH	0.000	0.000	0.000	0.018	0.000	0.004
UTILIZATION PER EPISODE						
INPATIENT STAYS	0.108	0.071	0.148	0.109	0.101	0.103
INPATIENT DAYS	2.308	0.796	1.370	1.745	1.392	1.463
INPATIENT SURGERIES*	.	.	.	.	.	.
OUTPATIENT MD VISITS*	.	.	.	.	.	.
DRUG PRESCRIPTIONS	5.862	6.490	7.296	7.782	6.502	6.761
SNF DAYS*	.	.	.	.	.	.
ICF DAYS*	.	.	.	.	.	.
TOTAL LTC DAYS	4.046	2.398	1.111	2.855	2.571	2.629
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH VISITS	0.000	0.000	0.000	0.036	0.000	0.007
EXPENDITURES PER EPISODE						
INPATIENT HOSPITAL	442.71	19.76	12.23	42.29	144.57	123.89
INPATIENT PHYSICIAN	66.84	15.51	17.26	26.89	31.32	30.42
OUTPATIENT	130.40	98.87	68.77	82.00	100.82	97.02
PRESCRIPTION DRUG	47.71	52.55	47.12	57.68	49.75	51.35
SNF*	.	.	.	.	.	.
ICF*	.	.	.	.	.	.
TOTAL LTC	138.68	76.84	16.16	106.83	80.27	85.64
SNF % OF TOTAL LTC*	.	.	.	.	.	.
HOME HEALTH	0.00	0.00	0.00	0.91	0.00	0.18
TOTAL AFTERCARE	826.34	263.53	161.54	316.60	406.74	388.51

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Table 15I

Lens Extraction

NOT AVAILABLE FOR CALIFORNIA

On the other hand, the California results for the remaining selected diagnoses (stroke, pneumonia, congestive heart failure, acute myocardial infarction, and chronic pulmonary heart disease) are more reliable than the Michigan results due to the much larger number of episodes in California. The exception here is chronic pulmonary heart disease (Table 15G), where even California has an inexplicably small number of episodes. As with Michigan, the discussion of these results will be expedited by concentrating on total aftercare expenditures (the bottom row in each table) as a summary measure.

Unlike in Michigan, there are no exceptions to the general pattern of steep decline in total aftercare expenditures from 1981 through 1984 among these diagnoses in California. Expenditures for two of the diagnoses, pneumonia (Table 15B) and congestive heart failure (Table 15E), show a slight upturn in 1983 before falling further in 1984. In addition, expenditures for chronic pulmonary heart disease (Table 15H) do increase sharply in 1984 after dropping precipitously in the previous three years, but the average for 1981-1983 is still substantially higher than the figure for 1984. For all of the other diagnoses, however, total aftercare expenditures reach their lowest point in 1984. This was true for only a few of the diagnoses in Michigan (Tables 7A through 7D), in which expenditures peaked in different years for different diagnoses. At least for the selected diagnoses available in both states, then, California shows a much more pronounced downward trend in aftercare expenditures than does Michigan.

Differences among Diagnoses in California's Pre/Post-PPS Patterns. Finally, California's far more persistent decline in aftercare utilization across the available selected diagnoses among non-nursing home residents is even more clearly illustrated in Tables 16A through 16I, which stratify the aftercare measures by hospital-specific date of PPS implementation. Again,

TABLE 16A

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: STROKE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	11,953	2,435	14,388
PROBABILITY OF USE			
ANY SERVICE	0.921	0.922	0.921
INPATIENT HOSPITAL	0.091	0.060	0.086
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.691	0.716	0.695
PRESCRIPTION DRUG	0.713	0.722	0.715
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.210	0.185	0.206
HOME HEALTH	0.014	0.011	0.013
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.091	0.060	0.086
INPATIENT DAYS	1.558	0.082	1.443
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	3.706	3.745	3.713
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	7.066	5.887	6.866
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.016	0.003	0.014
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	64.50	30.02	58.66
INPATIENT PHYSICIAN	21.63	14.14	20.36
OUTPATIENT	63.67	62.78	63.52
PRESCRIPTION DRUG	27.81	25.00	27.34
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	243.97	204.00	237.21
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	1.72	1.18	1.63
TOTAL AFTERCARE	423.30	337.13	408.71

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 16B

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: PNEUMONIA

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	11,899	2,174	14,073
PROBABILITY OF USE			
ANY SERVICE	0.930	0.934	0.931
INPATIENT HOSPITAL	0.073	0.049	0.069
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.696	0.712	0.698
PRESCRIPTION DRUG	0.780	0.786	0.781
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.146	0.141	0.145
HOME HEALTH	0.005	0.006	0.005
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.073	0.049	0.069
INPATIENT DAYS	0.949	0.642	0.902
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.664	4.705	4.670
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	5.815	5.222	5.723
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.040	0.030	0.039
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	57.74	33.96	54.07
INPATIENT PHYSICIAN	20.13	11.39	18.78
OUTPATIENT	65.11	71.53	66.10
PRESCRIPTION DRUG	34.66	32.15	34.28
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	160.30	152.09	159.03
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	1.00	0.98	1.00
TOTAL AFTERCARE	338.95	302.09	333.26

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Table 16C

Total Hip Replacement

NOT AVAILABLE FOR CALIFORNIA

Table 16D

Ingunial Hernia Repair

NOT AVAILABLE FOR CALIFORNIA

TABLE 16E

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CONGESTIVE HEART FAILURE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	17,651	3,256	20,907
PROBABILITY OF USE			
ANY SERVICE	0.955	0.953	0.955
INPATIENT HOSPITAL	0.086	0.069	0.083
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.733	0.736	0.734
PRESCRIPTION DRUG	0.855	0.872	0.858
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.109	0.095	0.107
HOME HEALTH	0.005	0.007	0.005
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.086	0.069	0.083
INPATIENT DAYS	1.056	0.777	1.012
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	5.975	5.991	5.977
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	3.646	3.333	3.597
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.018	0.070	0.026
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	62.23	56.99	61.41
INPATIENT PHYSICIAN	23.70	13.91	22.18
OUTPATIENT	79.88	72.69	78.76
PRESCRIPTION DRUG	42.97	36.63	41.99
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	117.31	107.23	115.74
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.65	1.79	0.83
TOTAL AFTERCARE	326.75	289.24	320.91

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

TABLE 16F

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: ACUTE MYOCARDIAL INFARCTION

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	7,556	1,478	9,034
PROBABILITY OF USE			
ANY SERVICE	0.920	0.915	0.919
INPATIENT HOSPITAL	0.082	0.075	0.081
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.653	0.651	0.653
PRESCRIPTION DRUG	0.757	0.777	0.760
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.060	0.057	0.060
HOME HEALTH	0.003	0.007	0.004
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.082	0.075	0.081
INPATIENT DAYS	0.886	0.714	0.858
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	4.838	4.891	4.847
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	1.938	1.684	1.897
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.013	0.018	0.014
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	36.23	29.54	35.14
INPATIENT PHYSICIAN	27.77	16.57	25.94
OUTPATIENT	60.93	52.91	59.62
PRESCRIPTION DRUG	35.73	32.07	35.13
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	64.03	52.33	62.12
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.46	0.60	0.49
TOTAL AFTERCARE	225.16	184.02	218.43

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Table 16G

Transurethral Prostatectomy

NOT AVAILABLE FOR CALIFORNIA

TABLE 16H

CALIFORNIA: AFTERCARE PERIOD
UTILIZATION AND EXPENDITURES
PPS STATUS
NON-NURSING HOME RESIDENTS
DIAGNOSIS: CHRONIC PULMONARY HEART DISEASE

	PRE-PPS	POST-PPS	1981-84
NUMBER OF EPISODES	231	35	266
PROBABILITY OF USE			
ANY SERVICE	0.935	1.000	0.944
INPATIENT HOSPITAL	0.104	0.086	0.102
INPATIENT SURGERY*	.	.	.
OUTPATIENT PHYSICIAN	0.736	0.771	0.741
PRESCRIPTION DRUG	0.762	0.886	0.778
SNF*	.	.	.
ICF*	.	.	.
SNF OR ICF	0.056	0.114	0.064
HOME HEALTH	0.000	0.029	0.004
UTILIZATION PER EPISODE			
INPATIENT STAYS	0.104	0.086	0.102
INPATIENT DAYS	1.299	1.800	1.365
INPATIENT SURGERIES*	.	.	.
OUTPATIENT MD VISITS*	.	.	.
DRUG PRESCRIPTIONS	6.732	7.086	6.778
SNF DAYS*	.	.	.
ICF DAYS*	.	.	.
TOTAL LTC DAYS	2.342	3.086	2.545
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH VISITS	0.000	0.057	0.008
EXPENDITURES PER EPISODE			
INPATIENT HOSPITAL	97.15	33.41	88.76
INPATIENT PHYSICIAN	26.46	33.64	27.40
OUTPATIENT	99.21	74.17	95.92
PRESCRIPTION DRUG	49.68	61.46	51.23
SNF*	.	.	.
ICF*	.	.	.
TOTAL LTC	72.67	148.85	82.70
SNF % OF TOTAL LTC*	.	.	.
HOME HEALTH	0.00	1.43	0.19
TOTAL AFTERCARE	345.17	352.96	346.20

* DATA NOT AVAILABLE OR MEANINGFUL FOR CALIFORNIA.

Table 16I

Lens Extraction

NOT AVAILABLE FOR CALIFORNIA

to keep the table numbers parallel with Michigan's, blank tables have been inserted where a procedure-based "diagnosis" was not available for California due to that state's lack of procedure codes. Unlike in Michigan, where the results were more mixed (Tables 8A through 8I), total aftercare expenditures are lower in the post-PPS period than in the pre-PPS period in all of the selected diagnoses available in California except chronic pulmonary heart disease, which again contains an very low number of episodes.

Most of the detailed measures of aftercare utilization and expenditure in Tables 16A through 16I also show much lower post-PPS levels than pre-PPS levels for each of the selected diagnoses available in California. The measures which deviate from this overall pattern are generally the same ones found in the overall results (Table 10C) -- certain prescription drug and home health measures, plus the overall probability of using any service. Three of the diagnoses show an increase rather than a decrease from the pre-PPS period to the post-PPS period in at least one of the outpatient physician measures. These include pneumonia (Table 16B), congestive heart failure (Table 16E), and chronic pulmonary heart disease (Table 16H).

In addition, two of the diagnoses produce a decrease rather than an increase in at least one of the home health measures: stroke (Table 16A) and pneumonia (Table 16B). Both congestive heart failure (Table 16E) and acute myocardial infarction (Table 16F) yield a decrease rather than an increase in the overall probability of using any service. Perhaps most interesting (but also least reliable) is the finding that chronic pulmonary heart disease (Table 16H) also shows an increase rather than a decrease in two inpatient measures, two nursing home measures, and all three of the prescription drug measures. Nevertheless, aside from the few other measures that follow their patterns in the entire population of episodes by rising

rather than declining in 1984, all of these selected diagnoses show substantial reductions in aftercare utilization from the pre-PPS period to the post-PPS period in California.

Discussion

Summary. The results of both the annual analysis and the pre/post-PPS analysis demonstrate an unexpected overall decline in Medicaid-funded post-hospital utilization and expenditures over time. In Michigan, the typical pattern is an increase in aftercare utilization from 1981 through 1983, followed by a sharp dropoff in 1984. The major exceptions to this pattern are found in certain outpatient, prescription drug, and SNF measures, all of which rise throughout the period to their highest levels in 1984. In California, most of the measures decline throughout the entire period, or at least from 1982, although the one measure that follows the Michigan pattern of peaking in 1983 is a significant one: inpatient hospital expenditures. Only certain measures of home health care are not lower in 1984 than in previous years in California.

These overall patterns generally persist when the total population of episodes is broken down into various subpopulations on the basis of nursing home residence, age, and diagnosis, although some deviations do occur in particular groups on certain measures. Not surprisingly, nursing home residents generally show higher levels of aftercare utilization, mostly additional nursing home utilization. In California, there is some evidence of a greater overall decline in aftercare utilization over time among nursing home residents than among non-residents.

Aside from the expected finding that nursing home utilization increases with age, the two states show some interesting contrasts in their age-related patterns of aftercare. Most importantly, total aftercare expenditures increase with age in Michigan, but in California they are almost as high in the under 65 age group as in the over 85 age group and are lowest in the 65 to 74 age group. California's results for the nine selected diagnoses are fairly

consistent in showing total aftercare expenditures generally declining throughout the period of 1981 to 1984. In Michigan, the patterns are more varied across diagnoses, although five of them produced a general decline in total aftercare expenditures.

Distributions of inpatient readmissions and nursing home admissions across various time intervals following discharge from the key inpatient stay reveal some evidence of a slight shift toward later inpatient readmissions in Michigan, but not in California. Both states, however, show a marked decline over time in the average length of an inpatient stay in the aftercare period, although Michigan's starts higher and drops faster, actually falling below California's in 1984. Both states also show some mixed evidence of an increase over time in surgical complications, especially those diagnosed in an inpatient setting.

Finally, also worth noting are some even broader features of these results. First, they appear to corroborate the regional differences in levels of health-care utilization and expenditure observed in previous studies, with Michigan showing much higher levels on all measures except physician expenditures, both inpatient and outpatient, than California. Part of this latter result, however, could be due to the way in which physician claims had to be allocated for California, as explained in the Methods section.

Second, the rate of inpatient admissions per 1,000 enrollees declines in 1984 in both states; but the dropoff is much larger in Michigan than in California, especially among crossovers. This striking result probably reflects the combined impact of Medicare PPS and anticipatory behavior among providers facing implementation of Michigan's own DRG-based reimbursement system and a strengthened system of prior authorization for elective inpatient hospital admissions. Sorting out the separate influences of the numerous changes in

the two states' Medicaid programs, however, would be extremely difficult, even with the use of more sophisticated methods of time-series analysis.

Conclusion. The overall pattern of decline in post-hospital utilization and expenditure in both states, even with the exceptions noted, clearly contradicts many of the hypotheses posited earlier. The decline in inpatient days and average length of stay was anticipated, as was the increase in the SNF percentage of long-term care days and dollars in Michigan; but all other hypotheses are not supported by these data. These results could be interpreted to mean that, under PPS, Medicare/Medicaid crossover patients are increasingly being steered away from institutional aftercare (hospital readmission and nursing home placement) and are instead being treated more often in outpatient settings (including home health care in California) and with more prescription drugs. Moreover, when Michigan enrollees do enter a nursing home, it is increasingly likely to be for SNF rather than ICF care. The results also cast doubt on the contention that the cost of providing aftercare has been shifting from Medicare to Medicaid in the post-PPS era.

How such trends are evaluated depends on one's particular values. It could mean that inappropriate use of institutional care is being reduced and shifted to more appropriate non-institutional settings; i.e., the same amount of care is being delivered with the same level of quality but at less cost. Alternatively, it could imply that crossover patients are increasingly being discriminated against and denied access to needed institutional care, and are instead having to make more frequent visits to physicians, who in turn are prescribing more drug therapy. Moreover, patients that do get nursing home care may increasingly require a higher level of care (SNF) because they are indeed being discharged "quicker and sicker." Aftercare costs may thus be getting squeezed at the expense of poorer quality care for the most

vulnerable of patients: poor, sick, elderly and/or disabled patients eligible for Medicaid as well as Medicare. If so, PPS may have increased the "need" for aftercare, yet the health care system may not have increased its capacity to meet that need.

A choice of these interpretations -- or some compromise in between -- cannot be based on these findings alone. Clearly, further research is needed on this important issue, including more rigorous analysis of this rich dataset. Multivariate analyses can incorporate the patient's health-care utilization and expenditure in the 180-day precare period of his/her inpatient episode, thereby providing additional of control over patient case mix. Characteristics of the key stay itself (e.g., length of stay) can also be included. The episodes can be aggregated by month rather than by year, thereby providing a sufficient number of observations for time-series analysis. This could include Box-Jenkins analysis, examining the effects of various intervention points (e.g., enactment vs. implementation of PPS) on selected monthly series (e.g., total aftercare expenditures).

Beyond this study, moreover, numerous additional questions surrounding this issue need to be addressed. Many of these questions stem from our lack of understanding of the basic dynamics of the economics of post-hospital care. Most fundamentally, the concepts of "need" and "demand" for such services, and of their "supply" and the "capacity" of the health care system to provide them, need clarification. Better methods of measuring, monitoring, and forecasting them need to be developed if officials are to have the kind of information they need to make the difficult decisions arising in this increasingly important area of health policy.

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An Analysis of Prospective Payment's Effects on Health Care Spending for Providers of Non-Hospital Services

FINAL REPORT

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MEDICARE'S PROSPECTIVE PAYMENT INCENTIVES AND THEIR EFFECTS ON PROVIDERS OF NON-HOSPITAL SERVICES

BACKGROUND OF THE STUDY

The purpose of this study is to assess the effects of Medicare's Prospective Payment System (PPS) on providers of non-hospital services. While PPS encouraged restraint in the provision of inpatient hospital services, it did little or nothing to discourage the provision of services in alternative settings. Some advocates for the elderly have charged that hospitals operating under PPS are discharging patients "quicker and sicker" and some of the preliminary evidence indicates that a greater percentage of patients are being discharged to nursing homes or to home health care. Patients discharged earlier are likely to require additional medical care either in an institutional setting or in an ambulatory setting. Thus, it appears that the hospital savings achieved under PPS may be at least partially offset by the use of additional services in non-hospital settings.

Indeed, Medicare has actively encouraged the provision of care in alternative settings that are believed less costly. Beginning in October 1982 Medicare began to pay 100 percent of the customary and prevailing rate for designated surgeries performed in approved Ambulatory Surgery Centers (ASCs), and the list of designated surgeries was greatly expanded in 1987. In December of 1982 Part B coverage was extended to Comprehensive Outpatient Rehabilitation Facilities (CORFs), and in November of 1983 Medicare hospice benefits were extended to the terminally ill. Thus, it appears that PPS and other Medicare initiatives implemented during the early 1980s have had

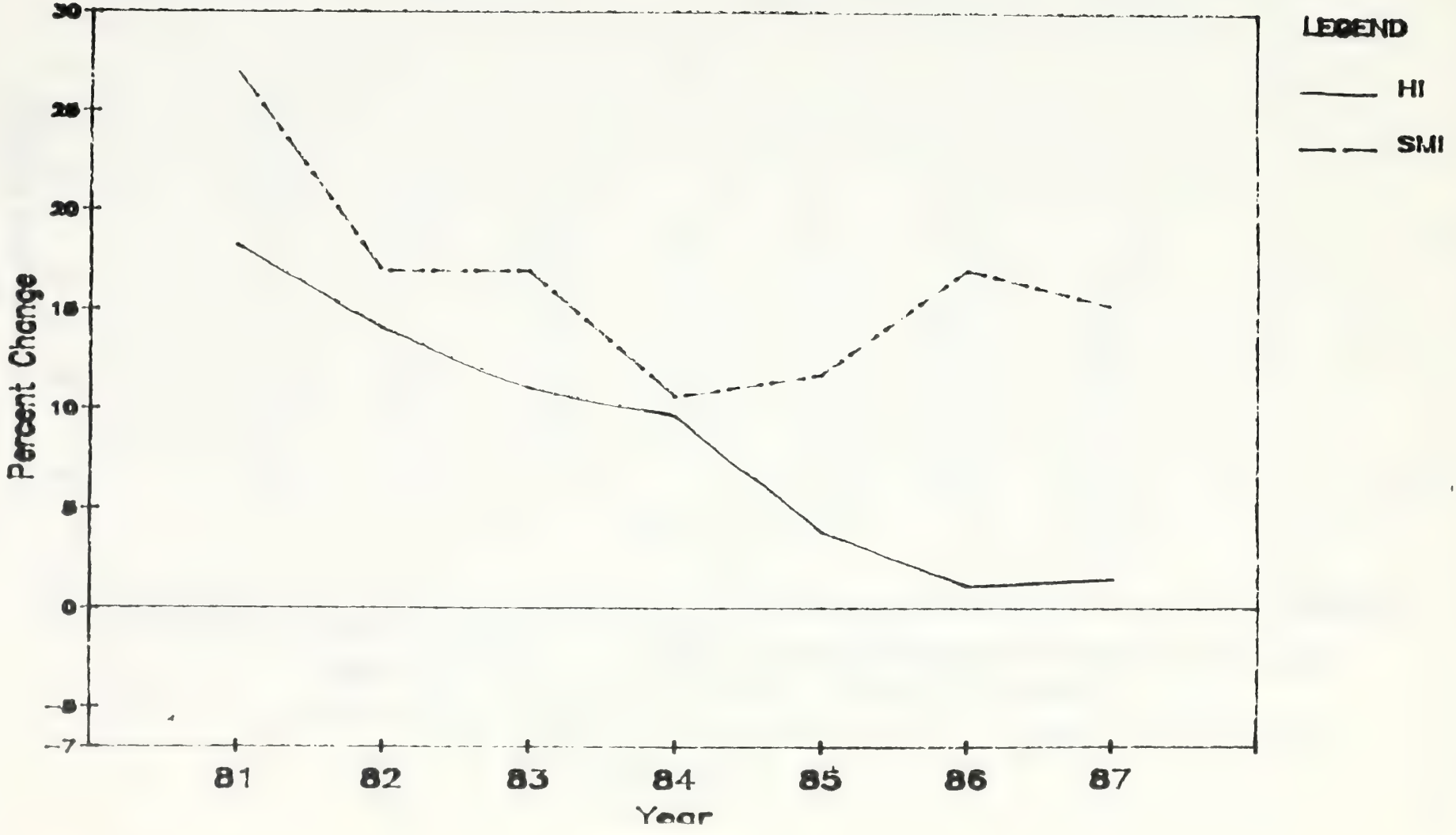
considerable potential for influencing not only providers of in-patient hospital care, but also providers of other services that might substitute for hospital care.

In general, Hospital Insurance (HI) covers inpatient hospital services, and Supplemental Medical Insurance (SMI) covers physician and other services normally administered in a non-acute care setting. Exhibit 1 displays recent trends in HI and SMI spending. Between 1981 and 1987 the average annual rate of growth in SMI incurred benefit payments has been 16.5 percent compared to a rate of 8.5 percent for HI incurred benefit payments. These figures imply a substantial trade-off in Part A and Part B spending, and indicate that PPS may be having a significant impact on the use of services delivered outside the inpatient setting. It is noteworthy that the strongest divergence in these spending trends has come after the PPS transition year of 1984. Exhibits 1A and 1B display these data after adjusting for inflation based on the medical care CPI, the physician component of the medical care CPI, and the DRI Hospital Marketbasket.

Exhibit 2 displays the effects of these diverging rates of growth in HI and SMI incurred benefit payments. (Exhibits 2A and 2B adjust these trends for inflation). SMI comprised 28.8 percent of total Medicare spending in 1981, and grew to 38.5 percent of Medicare spending in 1987. These rather striking figures may understate the extent of prospective payment's impact on other providers, because HI pays for some alternatives to hospital inpatient care. HI pays for the first 20 days of skilled nursing facility (SNF) care following a hospital stay, and it shares the cost of up to 80 additional days. HI also furnishes some hospice and home health benefits.

Exhibit 1

Annual Percent Change in HI and SMI Incurred Benefit Payments Per Aged Enrollee: Calendar Years 1981 – 1987



HMO ENROLLMENT AGGREGATE DEMAND

Exhibit 1A

Annual Percent Change in HI and SMI Incurred Benefit Payments Per Aged Enrollee: Calendar Years 1981 – 1987 (Adjusted to 1982 Dollars)

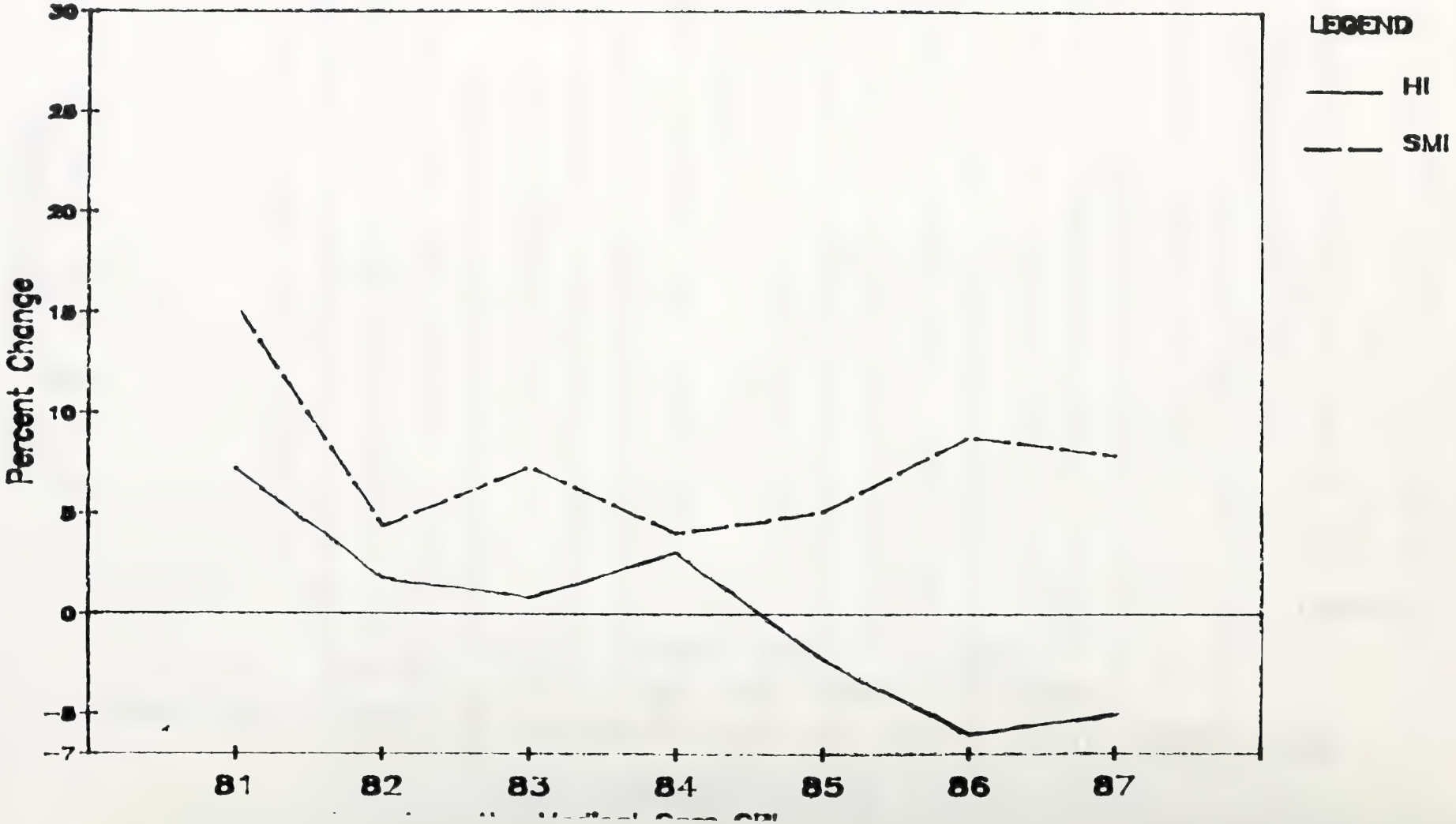
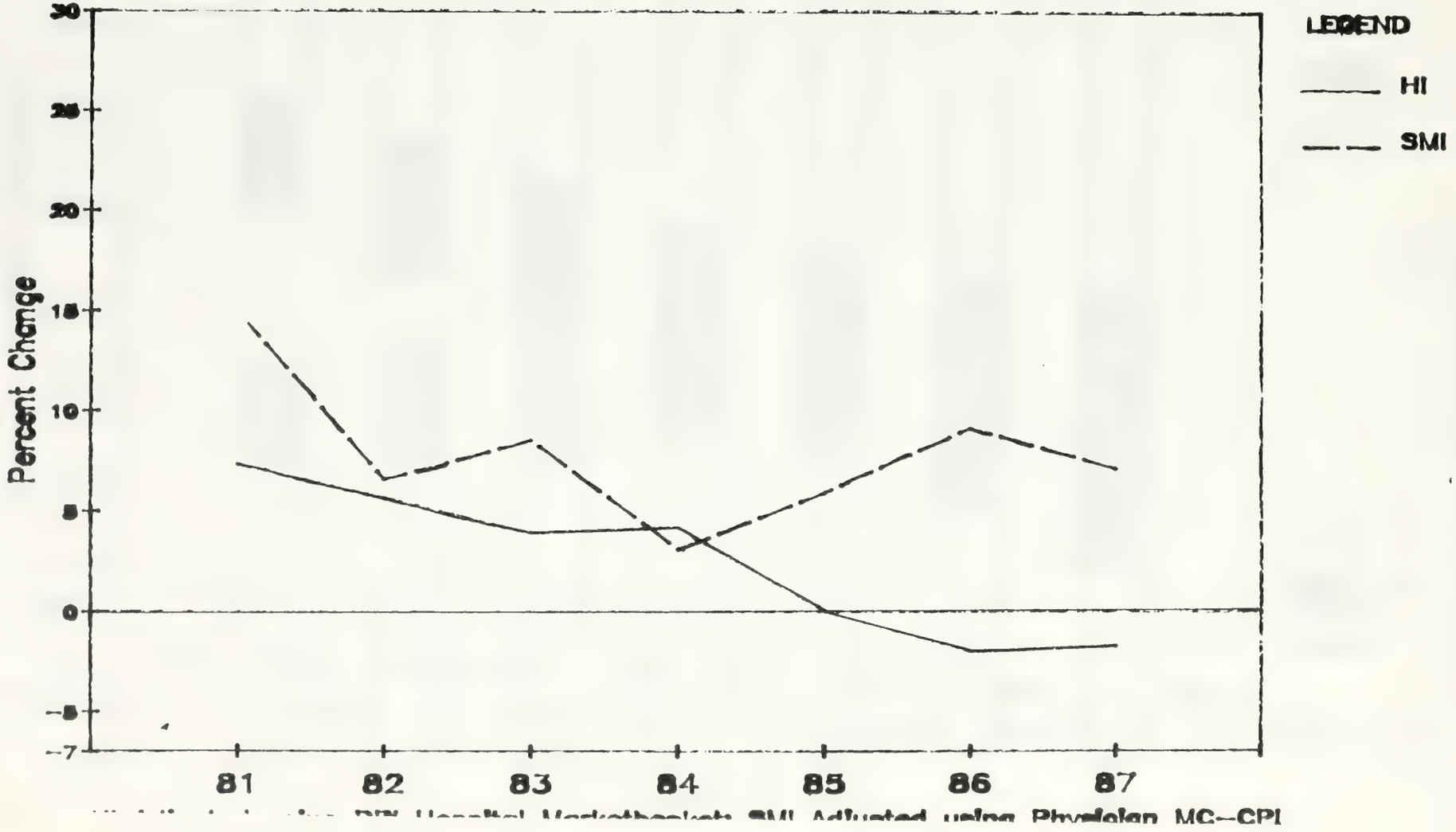


Exhibit 1B

Annual Percent Change in HI and SMI Incurred Benefit Payments Per Aged Enrollee: Calendar Years 1981 -- 1987 (Adjusted to 1982 Dollars)



HMO ENROLLMENT AGGREGATE DEMAND

Exhibit 2

Growth in Total HI and SMI Incurred Benefit Payments for Aged Enrollees: Calendar Years 1981 – 1987

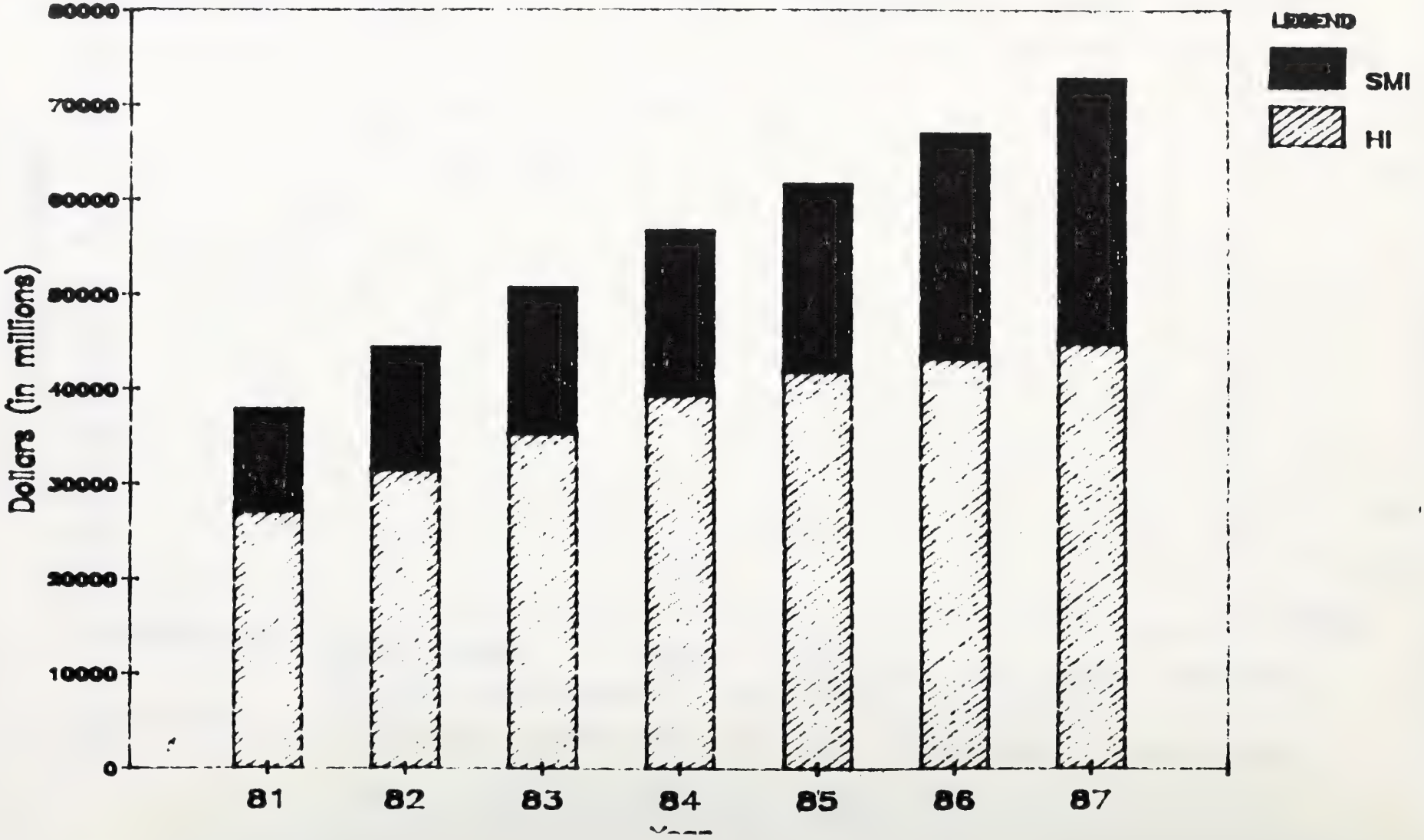
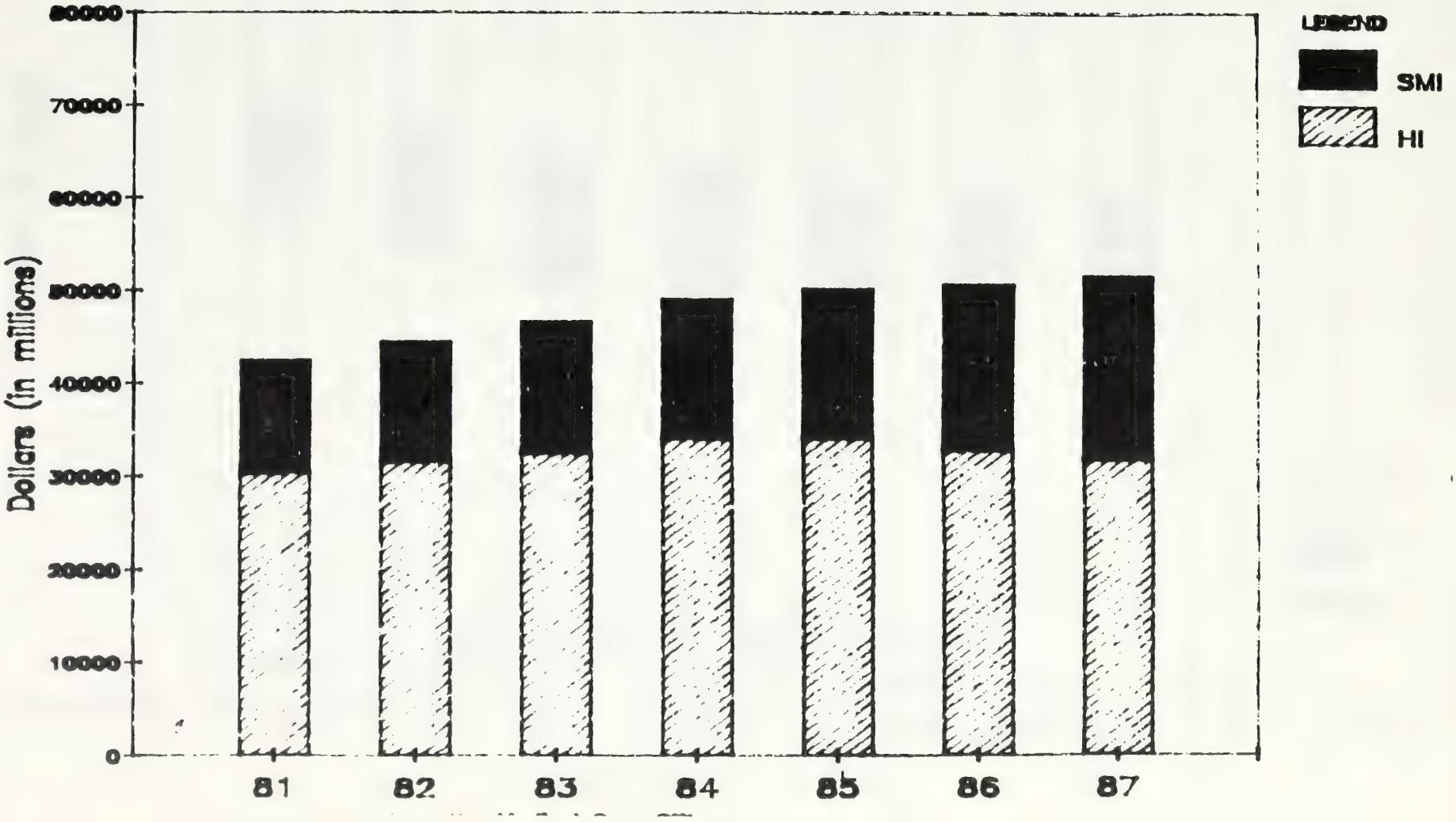


Exhibit 2A

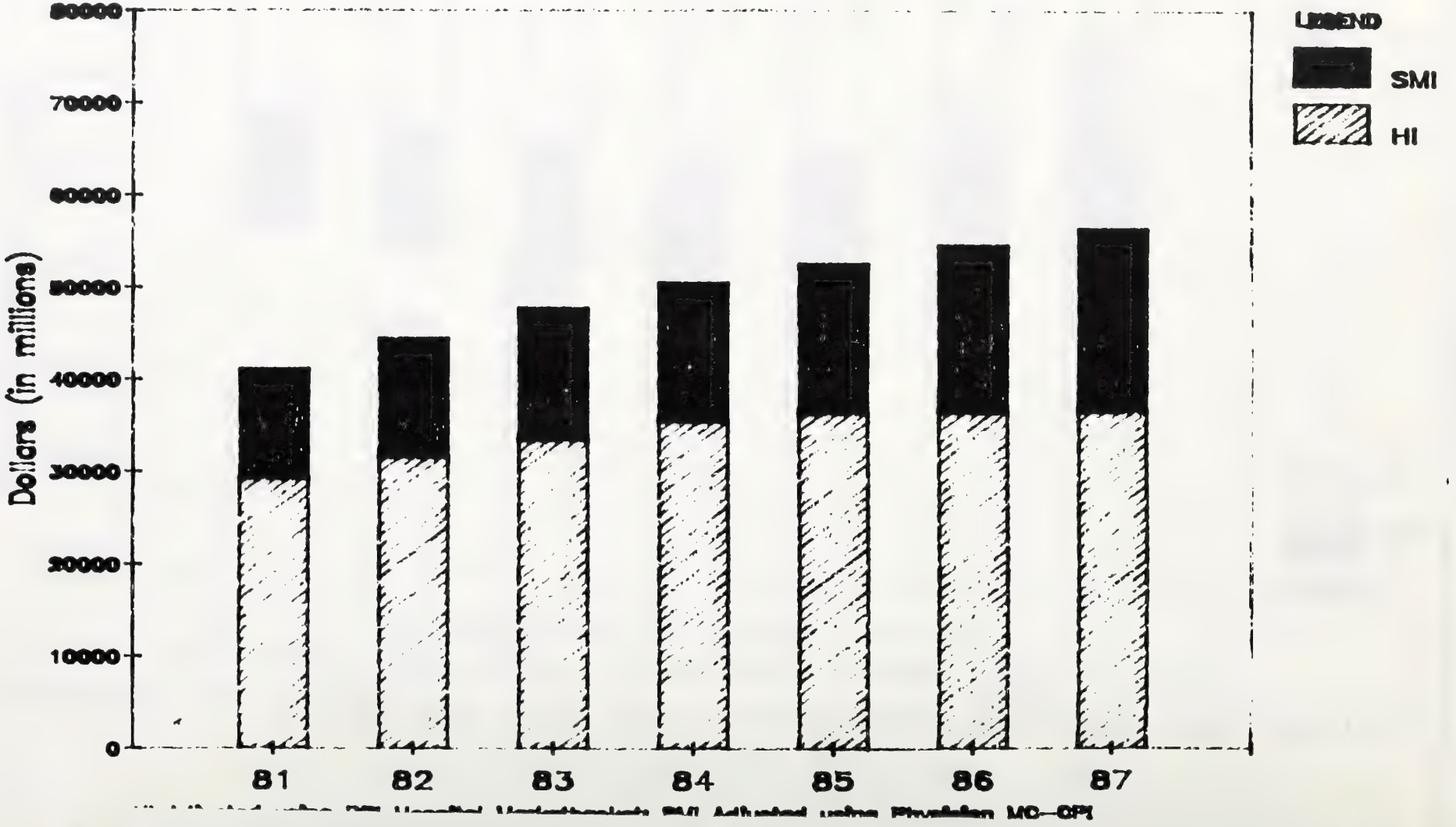
Growth in Total HI and SMI Incurred Benefit Payments for Aged Enrollees: Calendar Years 1981 – 1987 (Adjusted to 1982 Dollars)



HMO ENROLLMENT AGGREGATE DEMAND

Exhibit 2B

Growth in Total HI and SMI Incurred Benefit Payments for Aged Enrollees: Calendar Years 1981 – 1987 (Adjusted to 1982 Dollars)



APPROACH TO THE STUDY

Although these aggregate spending figures strongly suggest that PPS is changing the distribution of Medicare spending between hospital and non-hospital providers, it is extremely difficult to investigate the degree of any such change. Medicare's Part A and Part B data systems are maintained separately, and many of the services that might substitute for inpatient hospital care are only partially covered by Medicare if they are covered at all.

SMI reimburses claims only after the beneficiary has satisfied the deductible requirement, currently set at $75 per year. For beneficiaries who have met this spending threshold, Part B normally pays 80 percent of approved charges. No further payment is required of the beneficiary if the provider has agreed to accept "assignment," but unassigned claims may require an additional payment by the beneficiary or the beneficiary's Medi-gap insurance plan. Finally, some services, such as prescription drugs and long-term care, are not generally covered by Medicare.

Claims data from the Michigan Medicaid program offer several advantages in exploring prospective payment's influence on spending for services not furnished in inpatient hospital settings. First, the Medicaid program covers a large number of "crossovers" -- i.e., Medicaid enrollees who are also enrolled in Medicare SMI through a provision that allows state Medicaid programs to "buy in" to the federal program. Under the provisions of this "buy in" arrangement, the Medicaid program pays the Part B premium that is normally paid by the beneficiary. It also pays deductibles and copayments required under the Medicare program. To serve this secondary payor role, the Medicaid program must maintain records of all Medicare and Medicaid payments

for services that are not fully reimbursed by the Medicare program. Consequently, this single data system furnishes an unusually comprehensive record of payments for services covered by Medicare.

Second, services such as prescription drugs and long-term care that are not covered by Medicare are covered by Medicaid, allowing an analysis of trends in the use of these services. Although these services are not covered by Medicare, their use may be influenced by PPS. Consequently, the Michigan Medicaid claims data permit an analysis of use and spending trends in a full range of services that could substitute for inpatient care.

Third, the Medicaid program data are maintained in a system that allows relatively easy merging of inpatient and outpatient claims at the patient level. This is essential for any analysis of potential substitutions between Part A and Part B services, because it permits us to associate declines in Part A spending with increases in Part B spending. As mentioned above, Medicare files are not maintained in a fashion that facilitates such linkage and analysis. Consequently, this study uses crossover data from the Michigan Medicaid program to explore the impact of PPS on non-hospital providers.

Our general approach in comparing pre- and post-PPS health care spending is to decompose spending per thousand crossovers into the following components:

$$\frac{\text{SPENDING}}{\text{1,000 XOVERS}} = \frac{\text{USERS}}{\text{1,000 XOVERS}} \times \frac{\text{SERVICE UNITS}}{\text{USER}} \times \frac{\text{EXPENDITURE}}{\text{SERVICE UNIT}}$$

where: SPENDING PER 1,000 CROSSOVERS -- a measure of total spending for a particular type of provider (e.g., physicians). Spending is expressed in this fashion to remove the influence of changes in the number of crossovers from year to year.

USERS PER 1,000 CROSSOVERS -- the proportion of all crossovers that use the services of a particular provider type during a calendar year (e.g., the proportion receiving at least one physician service).

SERVICE UNITS PER USER -- the rate of service consumption among users (e.g., the number of physician visits).

EXPENDITURE PER SERVICE UNIT -- the total reimbursements to a category of providers divided by the number of service units for that category of providers (e.g., total reimbursements to physicians divided by the number of physician visits).

This spending identity furnishes a framework that is useful in identifying the source of any change in per capita spending for each provider type. USERS PER 1,000 CROSSOVERS and SERVICE UNITS PER USER allow for the examination of changes in the percentage of the population using a service and in the rate of use among these users. EXPENDITURE PER SERVICE UNIT allows for changes in the cost of services over time. To facilitate the comparison of spending levels in 1982 and 1984, all 1984 dollars are deflated to 1982 levels using the indices displayed in Appendix C.

An important issue that arises in comparing use and spending rates from 1982 and 1984 is that of changes in casemix and practice patterns. Scientific breakthroughs and advances in technology can dramatically change the patterns of use and spending for diagnosis and treatment of particular conditions. Surgeries previously performed on an inpatient basis might now be performed in outpatient settings; conditions that were previously untreatable might now be treated with costly procedures; and conditions that previously required surgery might now be treated with drugs or non-invasive procedures.

To control for these non-PPS effects, we examined use and spending changes not only for the general crossover population, but also for four subpopulations that were treated for one of the following diagnoses: gall bladder disease, essential hypertension, diabetes mellitus and congestive heart failure. These four subpopulations were selected because there were no

dramatic breakthroughs in the diagnosis and treatment of these conditions during the study period. Thus, we can rule out at least some of the alternative explanations that might account for changes in spending patterns in the pre and post-PPS period. (Criteria use to identify these four subpopulations are presented in Appendix D.)

Several categories of crossovers were excluded from the analysis in order to facilitate the comparison of 1982 and 1984 spending. First, we excluded any crossover not continuously enrolled during the 1982 or 1984 comparison years. This exclusion allows us to produce per-capita use and spending profiles that represent a full year of experience for each crossover. Second, we excluded Medically Needy crossovers because they are unusually heavy users of health care services. These people do not qualify for Medicaid under the standard income used for the categorically needy, but their recognized income is reduced through spending for health care services. A high percentage of this population resides in long-term care facilities.

A third category of crossovers excluded from the analysis is comprised of people receiving surgeries included on HCFA's 1982 Ambulatory Surgery Center (ASC) list. Beginning in October of 1982 Medicare began paying 100 percent of the professional fees and facility charges associated with these procedures if the procedures were performed in an ASC. This creates a problem for monitoring Medicare expenditures with crossover data, because services reimbursed at 100 percent by Medicare are not normally reported in the Michigan Medicaid files. Consequently, any patient receiving a service on HCFA's ASC list in either year was dropped from the analysis in order to ensure the comparability of the data from the two years. This decision is also consistent with our intent to focus the analysis on provider impacts

attributable to PPS -- although Medicare's efforts to encourage use of ASCs undoubtedly had a significant impact on physicians and ASCs, this initiative preceded the implementation of PPS by a year and its effects grew during the study period.

LIMITATIONS OF CROSSOVER DATA ANALYSIS

The methodology presented above summarizes our reasons for undertaking the analysis of crossover data, the advantages we perceived in using these data, and our efforts to control for the influences of factors other than prospective payment. Through the process of compiling and analyzing the data, numerous limitations of crossover data analysis were discovered. These are summarized below.

Table 1 compares demographic, utilization and Medicare spending profiles for the U.S. Medicare population, the Michigan Medicare population and the study population of Michigan Medicare crossovers during 1982. The Medicare population of Michigan was generally very similar to that of the nation with respect to age, race and sex distributions. The rate of hospital admissions per enrollees was almost identical for Michigan and the U.S., but the average length of a hospital stay was 10.7 days in Michigan compared with 10.2 days for the nation. Average SMI and HI benefits per enrollee were somewhat higher in Michigan than they were for the nation. In general, the Medicare population profiles for Michigan and the U.S. were very similar with respect to the population characteristics compared in Table 1.

Table 1 also describes three groups of Michigan crossovers: all crossovers, those continuously enrolled and the study population (which excluded the continuously enrolled, those who received an ambulatory surgery

TABLE 1
Demographic, Utilization and Medicare Spending Profiles
of the Over 65 Medicare Enrollees in the U.S.,
Michigan and Michigan Crossover Population 1982

Total Enrollees	U.S. Medicare*	Michigan Medicare*	Michigan Medicaid Crossovers		
			All Xovers[1]	Continuously Enrolled Xovers	Study Pop.[3] (w/o ASC and MN people)
Total N	26,036,365	955,314	62,061	47,465	27,364
Age (% distribution)	100.0%	100.0%	100.0%	100.0%	100.0%
65-69	34.4	35.8	18.9	19.3	23.8
70-74	25.6	24.9	19.6	20.2	24.7
75-79	18.5	18.1	18.4	18.7	20.2
80-84	11.8	11.5	17.1	16.8	15.1
85 and over	9.8	9.6	25.9	25.1	16.2
Race (% distribution)	100.0%	100.0%	100.0%	100.0%	100.0%
White	91.0	91.0	68.0	66.8	58.2
Other	9.0	9.0	32.0	33.2	41.8
Sex (% distribution)	100.0%	100.0%	100.0%	100.0%	100.0%
Male	40.5	41.2	25.5	23.6	22.7
Female	59.5	58.8	74.5	76.4	77.3
Use of Medicare Benefits					
% of users receiving HI	36.6	33.6	31.8	29.3	31.3
HI amount per user of any service	$1,942	$2,029	--	--	$1627
SMI amount per user of any service	806	923	--	--	560
Total Medicare benefits per user	2,748	2,952	--	--	2187
HI amount per enrollee	$1,222	$1,388	--	--	--
SMI amount per enrollee	507	631	--	--	--
Total Medicare benefits per enrollee	1,729	2,019	--	--	--
Use of services					
Hospital admissions per 1000 enrollees	388	383	--	--	--
Hospital admissions per 1000 users	617	560	440	411	437
ALOS for hospital stays	10.2	10.7	13.4	12.4	11.7
Covered charges per day	$419	$468	--	--	$426

NOTE: Some crossover "users" did not meet the $75 SMI deductible. This may partially account for the lower levels of Medicare benefits received per user among crossovers. Another explanation for the lower levels of Medicare use among crossovers is that services paid 100 percent by Medicare are missing from the crossover claims data files.

* Calculations based on HCFA's Medicare Program Statistics. Pub. Nos. 03153 and 03172.

center (ASC) procedure and those who qualified for Medicaid because they were medically needy). The full population of crossovers and the continuously-enrolled population were very similar with respect to age, race and sex distributions, but these distributions differed dramatically from those of the Medicare populations described above. The crossovers were generally older, and there was a much higher proportion of non-whites and females than in the general Medicare populations. The study population of crossovers (excluding part-year enrollees, the medically needy and those who received ASC procedures) was more representative of Medicare enrollees with respect to its age distribution, but non-whites and females were even more heavily represented than in the general crossover population.

The most striking revelation in Table 1 is that the study population's rate of use and spending for Medicare services is less than the corresponding rates for the Michigan Medicare population. The study population's rate of admissions per 1,000 users was 437 compared to 560 for Michigan Medicare population; HI spending per crossover was $1,627 compared to $2,029 for Michigan Medicare; and SMI spending per crossover was $560 compared to $923 for Michigan Medicare. These figures indicate that either the study population of crossovers used fewer services than other Michigan Medicare enrollees, or a portion of the Medicare reimbursements are missing from the crossover files.

It is unlikely that the crossover population actually used fewer services, because the health status of poor people who qualify for Medicaid is typically worse than that of others. Moreover, the study population included a higher percentage of older people, non-whites and females -- population characteristics associated with a heavier use of health care services. This expectation of heavier crossover use is supported by the

longer average length of stay for crossovers' hospital care. Crossover hospital stays averaged 11.7 days compared to 10.7 days for the Michigan Medicare population. The evidence presented in Table 1 suggests that a significant part of Medicare HI and SMI reimbursements may be missing from the crossover files.

Discussions with individuals working in the Michigan Medicaid program's Bureau of Policy and Planning indicate that the crossover files generally do not include information about services fully paid by Medicare. Such information is not required for Medicaid to serve its function as a secondary payor. This probably accounts for the unexpectedly low rate of hospital admissions per 1,000 crossovers. A crossover's first hospital admission each year requires a deductible payment by the Medicaid program, but a second admission during the same benefit period is fully paid by Medicare. Consequently, the crossover files probably exclude the majority of these hospital stays.

This limitation of the crossover files may affect the figures for other services as well. Medicare pays 100 percent of approved facility and professional fees for certain surgical services performed in ASCs. It also pays 100 percent of the fee for certain home health services and SNF care during the first 20 days following a hospital stay of three or more days. Beginning July 1, 1984 Medicare began paying lab tests at 100 percent of a fee schedule for assigned claims. Thus, Medicare claims with no Medicaid liability may be missing from the crossover files for provider categories of great interest to this study.

For purposes of this study, a crossover was defined as a Medicaid enrollee who had at least one service reimbursed by Medicare. We assumed that the great majority of enrollees who met this definition of a crossover

would have Medicare coverage for both HI and SMI. A recent analysis of the Medicare HISKEW file for the State of California calls this assumption into question (Wright, 1988). This analysis identified SMI enrollees that were also enrolled in the California Medicaid program, and then attempted to find a record of HI enrollment. Approximately 20 percent of the California SMI enrollees dually enrolled in Medicaid were not found in Medicare's HI enrollment files. Thus, it appears that many of the individuals identified as crossovers on the basis of SMI reimbursements may not be covered by HI. This is especially troublesome in an evaluation of PPS effects because the hospital care for these individuals is not subject to Medicare's PPS incentives.

A problem of unknown magnitude is that some providers may fail to submit crossover bills to Medicaid. Providers treating crossovers must accept assignment, meaning that they cannot "balance bill" the patient. These providers accept responsibility for coordinating the Medicare and Medicaid payments by first submitting the bill to Medicare and then submitting the unpaid balance to Medicaid. It is conceivable that some providers, especially physicians, do not submit all of the copayment bills to Medicaid. Medicare typically pays eighty percent of the bill and the balance may be small.

The Medicaid program may use fee screens that further restrict the payment to a level that is less than the expected twenty percent. The Michigan Medicaid program instituted such a fee screen for Part B claims in August 1982. This screen limited total reimbursement for Part B services to 210 percent of the Medicaid-approved charge for that particular service. This screen may have reduced the total reimbursements for Part B services,

and it may have discouraged some providers from submitting crossover claims to the Medicaid program.

Medicaid-mandated changes in billing practices may have a minor influence on the total amounts reimbursed, but a significant impact on the way this spending is associated with various providers. One such change is the October 1984 removal of hospital-based physician services from hospital outpatient and inpatient billing forms. Hospital-based physician services were billed with facility charges before this change. Unfortunately, those individuals we interviewed from the Michigan Medicaid program were not able to determine whether such billing practices were widespread before October 1984.

A final limitation of this analysis is that the post-PPS data used in this study were collected during and soon after the implementation of PPS. To assess the effects of PPS on non-hospital providers, we set out to construct pre- and post-PPS spending profiles using crossover data from calendar years 1982 and 1985. Delays in obtaining the 1985 data forced us to use 1984 transition-year data for the "post-PPS" spending profiles. Thus, a substantial portion of the health care experience this study attributes to the "post-PPS" period is actually taken from a period in which many Michigan hospitals were treating Medicare patients on a reasonable cost reimbursement basis. Moreover, it is reasonable to expect that alternative site delivery systems may have responded to PPS at a pace that would not yield dramatic results during the first year.

FINDINGS

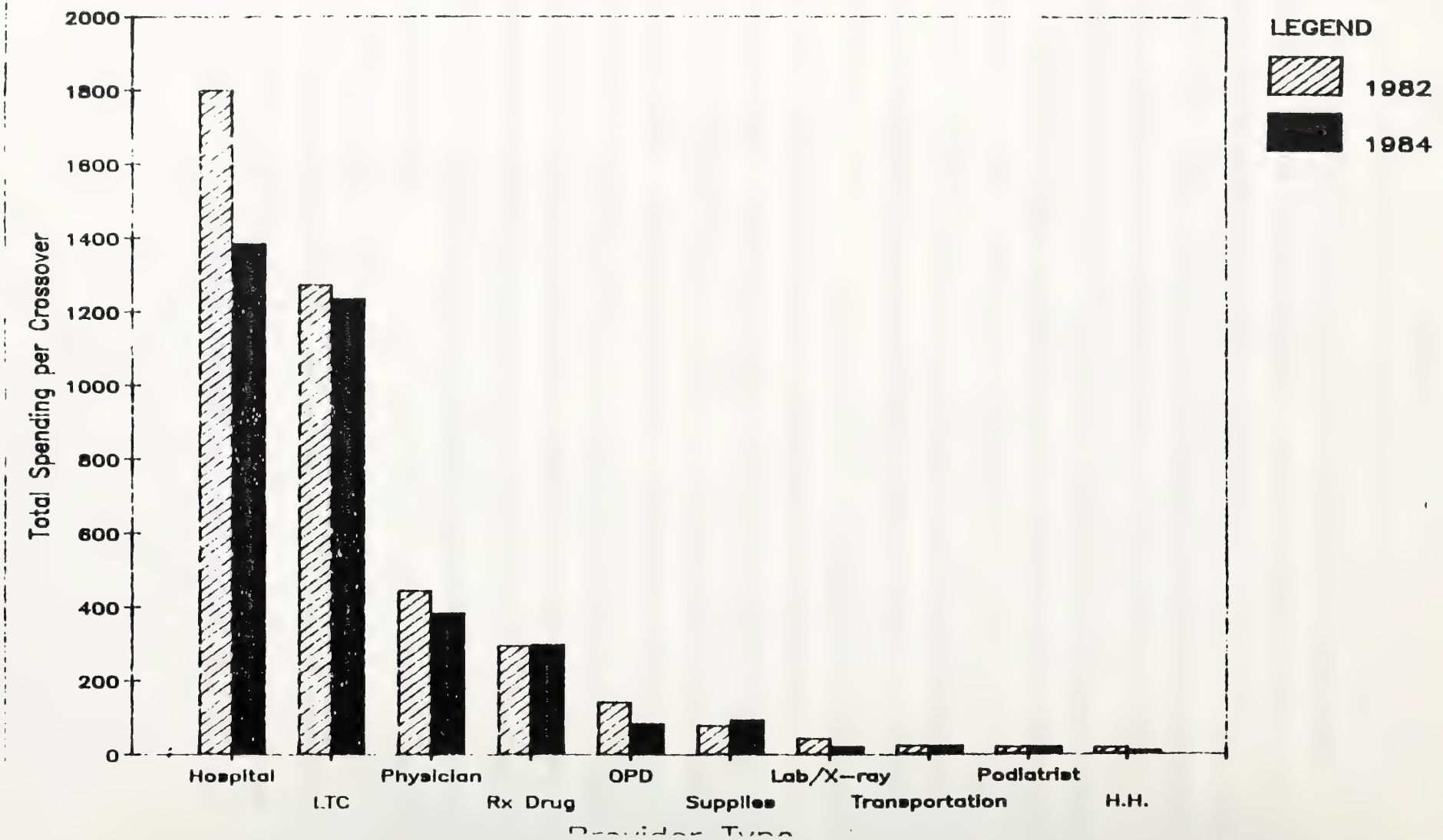
The crossover data examined for this study yield little evidence of a substitution of outpatient care for inpatient care. Exhibit 3 displays pre- and post-PPS spending per crossover for the ten provider categories that received an average of at least $10 per enrollee in 1982. When 1984 spending is adjusted to 1982 dollars, a general reduction in spending is evident across most provider categories and the bulk of this reduction came in the inpatient hospital category. Hospital inpatient spending fell by 23 percent between 1982 and 1984. Approximately half of this reduction is attributable to a decline in the rate of hospital admissions, and the rest of the reduction is attributable to a decline in the rate of spending per patient admitted to the hospital.

This pronounced drop in inpatient hospital spending is counter to the trend observed elsewhere for the Medicare population. Data furnished by HCFA's Office of the Actuary show that HI incurred benefit payments were still rising in 1984 even when adjusted for inflation (Exhibit 2A). American Hospital Association panel survey data for calendar year 1984 show the beginning of a decline in hospital admissions for the over-65 population beginning in the second quarter of 1984. But total admissions for the over-65 population actually exceeded the total admissions for 1982 by 2 percent (Freko, 1985).

Counter to our expectations, long-term care, physician services, hospital outpatient services, lab/x-ray and home health services also experienced substantial spending reductions during the study period. Prescription drugs and suppliers were the only two provider categories that exhibited an

Exhibit 3

Total Spending Per Crossover by Provider Type: 1982 – 1984



increase. Prescription drug spending rose 1 percent and supplier spending rose 20 percent.

Although comparable data are not available for 1982 and 1984, these spending reductions are not consistent with the spending increases Klingman and Helsel observed between 1980 and 1985. Using a one-percent sample of Medicare enrollees and adjusting for inflation, they found charges per Medicare enrollee increased 2 percent for SNF providers, 49 percent for home health agencies, 20 percent for physicians and suppliers, and 70 percent for hospital outpatient care (Klingman and Helsel, 1988). Their findings support widespread anecdotal evidence that the expansion of alternative site services has been associated with increased Medicare utilization of these services throughout the 1980s.

This initial overview of spending per crossover does not support the hypothesis that PPS has stimulated the provision of care by alternative site providers. The 1984 calendar year may be too early to observe such a PPS effect, or Medicaid reimbursement policies may be masking these trends. The following sections present the changes in 1982 and 1984 spending for each provider type and break out the degree to which these changes in spending are associated with changes in the number of users per 1,000 crossovers, the rate of service use per user, and the cost per service.

LONG-TERM CARE

Long-term care spending per 1,000 crossovers declined 3 percent between 1982 and 1984 (Table 2). This decline in the level of spending is attributable to a 7 percent decrease in the number of long-term care users per 1,000 crossovers. This decline was partially offset by a 3 percent

TABLE 2

Long Term Care Spending per 1000 Crossovers
and its components: 1982 - 1984
(1982 dollars)

	LTC Spending per 1000 crossovers	=	Users per 1000 crossovers	X	Days per User	X	Spending per Day
1982 Spending	$1,274,767		124.8		267.4		$38.20
1984 Spending	$1,236,612		116.4		275.3		$38.60
1982-84 percent change	- 3.0%		- 6.7%		+3.0%		+1.0%

increase in the average number of days per user, and a 1 percent increase in average spending per day.

In interpreting the reduction in crossover rates of use for LTC, it is important to recognize that LTC use is often best explained by constraints on the supply of nursing home beds rather than changes in the demand for these beds. Michigan has a history of nursing home occupancy rates that are higher than the national average. Michigan's nursing home occupancy rate stood at 93 percent in 1982 compared to 91 percent for the nation (NCHS, 1986).

This report discusses few of the spending patterns associated with the four tracer conditions described in the methodology section because the spending patterns for these conditions are generally very similar to those observed for the entire study population. This consistency is not apparent in the analysis of long-term care spending. LTC spending for the subpopulations with designated tracer conditions rose dramatically for some subpopulations and fell dramatically for others. For example, spending rose 32 percent for congestive heart failure patients and declined 27 percent for essential hypertension patients.

These spending shifts probably reveal less about the use of alternative site providers than they do about the instability of long-term care spending for small populations. Approximately 12 percent of crossovers required at least some long-term care each year and there was wide variation in the number of LTC days these patients required. Considering the relatively small number of crossovers requiring LTC and the diversity of their needs, it seems prudent to base the LTC analysis on the spending patterns of the entire study population which included 27,374 crossovers in 1982 and 25,302 crossovers in 1984.

PHYSICIAN SERVICES

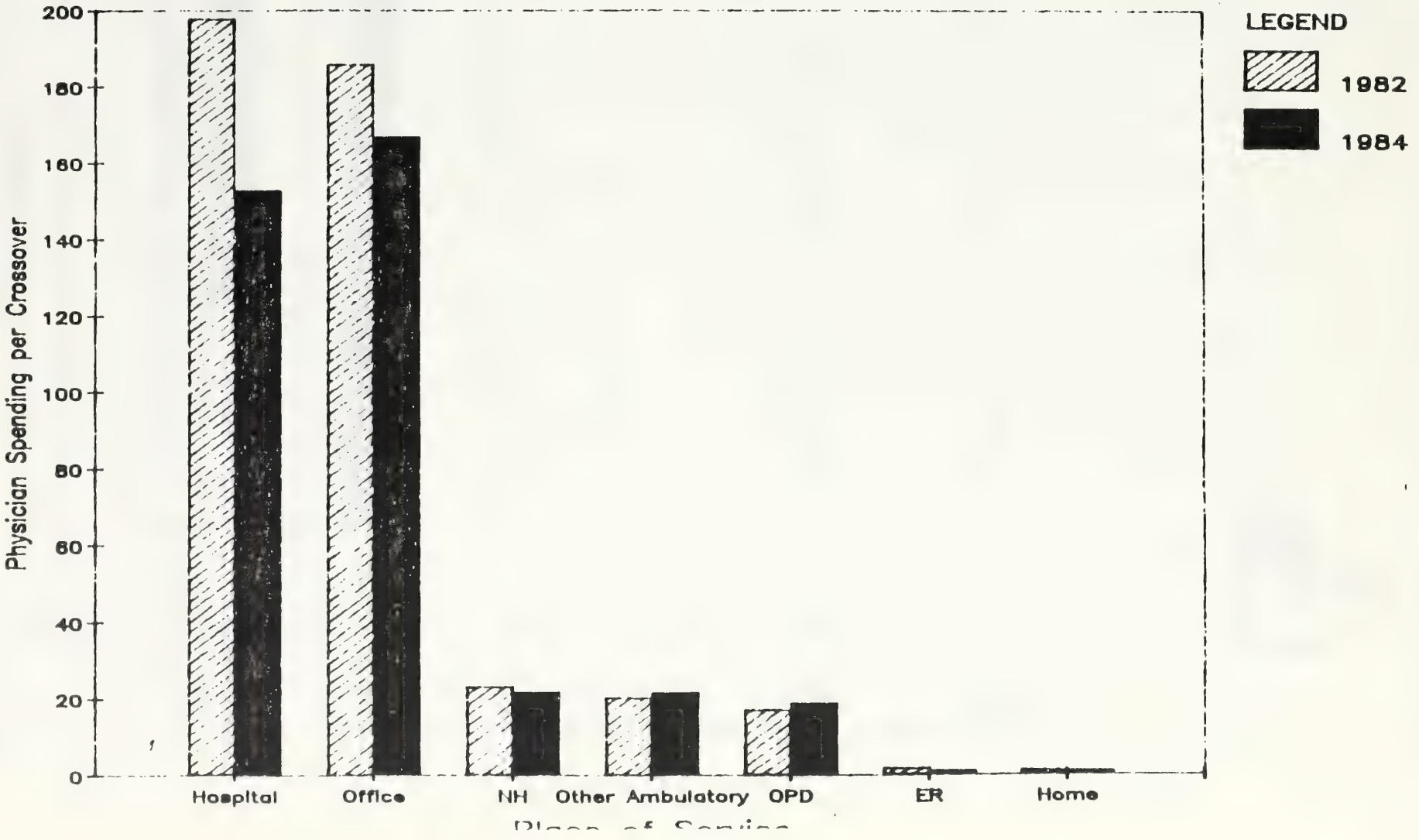
Most people probably associate physician services with provision of care in ambulatory settings, but it is noteworthy that a large portion of physician spending is for hospital inpatients. Indeed, physician spending per crossover averaged $197 for inpatient care and $185 for office-based care in 1982 (Exhibit 4). Between 1982 and 1984 spending for physician services declined in both categories, but it declined much more rapidly in the inpatient category. Physician spending in hospital inpatient settings fell 21 percent and spending in office settings fell 10 percent. By 1984 physician spending for office patients was greater than physician spending for hospital inpatients.

This finding is consistent with the 23 percent reduction in inpatient hospital spending discussed above. The combined effect of fewer admissions and shortened lengths of stay reduced the number of physician visits to hospital inpatients, and additional visits in outpatient settings were far too few to offset the drop in inpatient visits. Exhibit 5 displays physician visits per crossover by place of service in 1982 and 1984. Reduced hospital use reduced the number of physician inpatient visits by over 20 percent, but physician visits per 1,000 crossovers remained relatively constant in other settings.

Table 3 furnishes additional detail concerning the dynamics of physician spending in various settings. The 21 percent reduction in physician spending for hospital inpatients was primarily a result of 15 percent fewer visits per inpatient -- presumably due to shorter stays. Physician spending for inpatients was also reduced considerably by a decline of 8 percent in the number of inpatients using physician services. This decline can undoubtedly

Exhibit 4

Physician Spending Per Crossover by Place of Service: 1982 – 1984



HMO ENROLLMENT AGGREGATE DEMAND

Exhibit 5

Physician Visits Per Crossover by Place of Service: 1982 -- 1984

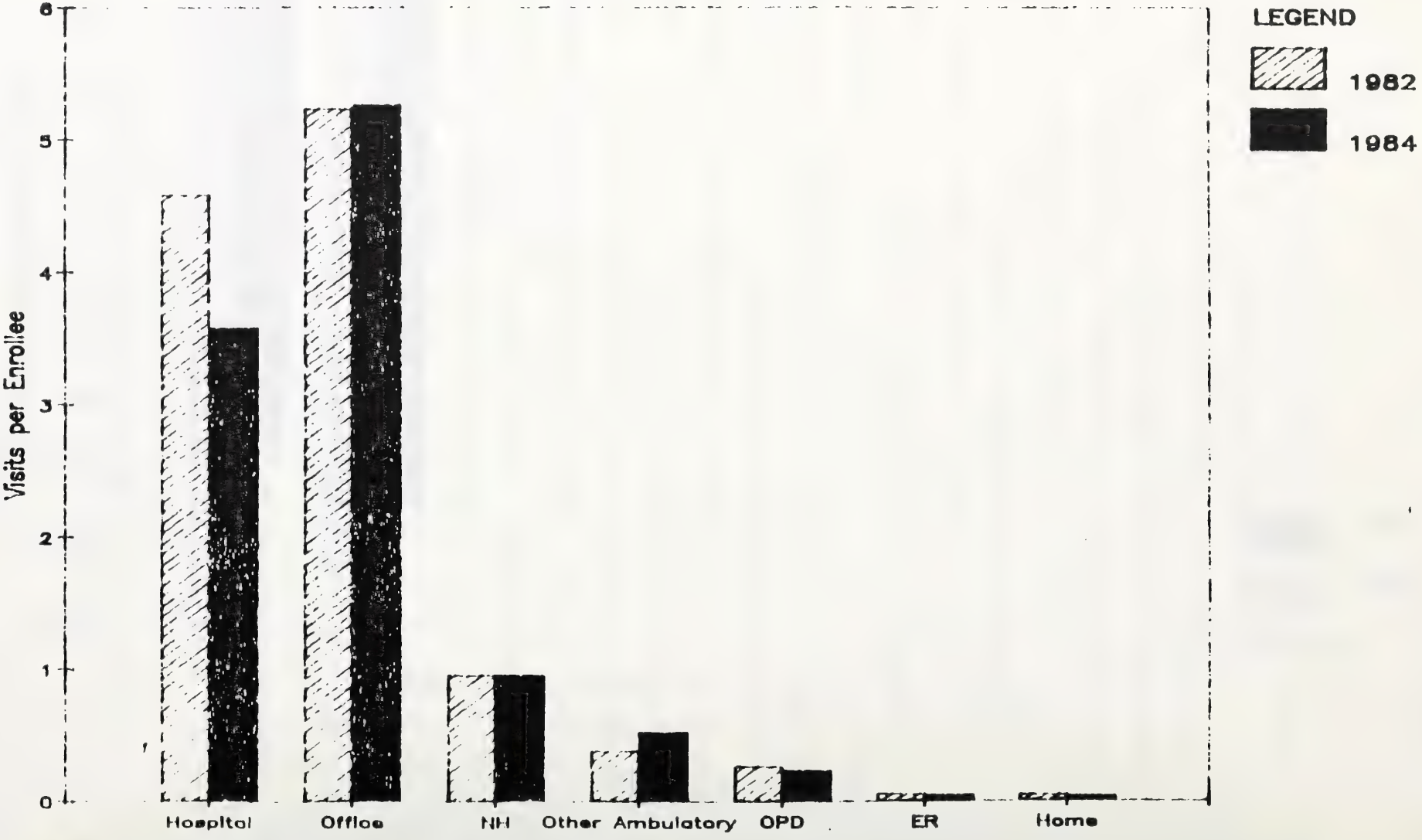


TABLE 3
Physician Spending per 1,000 Crossovers
and its Components: 1982 - 1984
(1982 dollars)

Year & Place of Service	Physician Spending per 1,000 Crossovers	=	Users per 1,000 Crossovers	X	Visits per User	X	Spending per Visit
1982							
Hospital inpatient	197,815		275.1		16.7		43.0
Office	185,643		770.5		6.8		35.6
Nursing Home	23,361		126.7		7.6		24.2
Other Ambulatory	20,519		187.0		2.1		51.6
Hospital O.P.D.	17,178		159.0		1.7		64.9
Hospital E.R.	1,907		48.3		1.2		32.6
Home	1,427		21.8		2.5		26.5
All Physicians	447,850		923.7		12.5		38.8
1984							
Hospital inpatient	156,331		252.3		14.2		43.5
Office	166,732		786.4		6.7		31.8
Nursing Home	20,879		130.2		7.4		21.8
Other Ambulatory	21,779		250.8		2.1		41.9
Hospital O.P.D.	18,864		148.5		1.6		81.1
Hospital E.R.	1,128		44.3		1.2		21.2
Home	1,097		18.3		2.3		25.7
All Physicians	386,811		931.7		11.4		36.3
1982-84 percent change							
Hospital inpatient	-21.0		-8.3		-15.0		1.2
Office	-10.2		2.1		-1.5		-10.7
Nursing Home	-10.6		2.8		-2.6		-9.9
Other Ambulatory	6.1		34.1		0.0		-18.8
Hospital O.P.D.	9.8		-6.6		-5.9		25.0
Hospital E.R.	-40.9		-8.3		0.0		-35.0
Home	-23.1		-16.1		-8.0		-3.0
All Physicians	-13.6		0.9		-8.8		-6.4

be traced to fewer hospital admissions.

The dynamics of change in spending for physician services in office settings was quite different from those of inpatient physician spending. The 10 percent decline in spending for office-based services was almost entirely attributable to an 11 percent reduction in spending per office visit. Reductions in spending per visit were also evident in all other outpatient settings with the exception of hospital outpatient departments.

These widespread reductions in spending per visit may indicate the effects of Medicaid or Medicare program changes unrelated to prospective payment. For example, the fee screen that Medicaid imposed on Part B claims in August 1982 may have marginally reduced physician payments. Another contributing factor may be Medicare's July 1984 decision to reimburse lab tests at 100 percent of a fee schedule for assigned claims. To the extent that these tests were previously billed with physician services, this change in billing and reimbursement practice could create an apparent drop in spending for physician services.

There was a sharp divergence in the trends for physician spending in hospital emergency room (ER) and outpatient department (OPD) settings. OPD physician spending per 1,000 crossovers rose 10 percent and ER physician spending dropped 41 percent. These opposing trends reflect parallel trends in spending per physician visit in these settings. Spending per OPD physician visit rose 25 percent and spending per ER physician visit dropped 35 percent. These changes probably reflect Medicaid policy changes that affect reimbursement for hospital outpatient services. During the study period Michigan Medicaid eliminated payment for non-emergency services furnished in a hospital emergency room and began paying for hospital outpatient services based on a fee schedule. As mentioned above, Michigan

also began requiring that hospital-based physician services be billed separately from facility charges. Thus, the diverging ER and OPD trends may be the product of a complex amalgam of policies that influenced billing practices and reimbursement levels.

Another physician services category that displayed a unique pattern is that of "other ambulatory" settings. The largest increase in use of physician services was a 34 percent increase in the number of "other ambulatory" users per 1,000 crossovers. The "other ambulatory" category is comprised largely of outpatient psychiatric clinics, and growth in this category indicates an apparent growth in the number of outpatient psychiatric visits. The large increase in the number of crossovers using physician services in "other ambulatory" settings was counterbalanced by a decline of 19 percent in spending per visit for physician services in these settings. These two elements together may indicate a change in the nature of the service offered in these settings, such as a substitution of group therapy for individual counseling.

Overall, physician spending per 1,000 crossovers declined 14 percent. The percentage of crossovers that had at least one physician visit was well over 90 percent in both 1982 and 1984, but the number of visits per user declined 9 percent during these two years and the average spending per visit declined 6 percent. Both of these factors are associated with the loss of physician visits in inpatient settings. The overall number of visits per user fell because physicians saw fewer inpatients, and each of these inpatients averaged fewer visits. The decline in average spending per visit is partially a result of the fewer hospital visits. Hospital visits were $7.40 more costly than office visits in 1982 and $11.80 more costly in 1984. With disproportionate reductions in the number of hospital visits, the

average cost of all visits declines. Moreover, changes in reimbursement and billing policies appear to have had particular success in reducing physician reimbursements in outpatient settings.

PRESCRIPTION DRUGS

Prescription drugs are the fourth largest spending category behind inpatient hospital care, long-term care and physician services. As with long-term care, Medicare offers little coverage for prescription drugs; thus, they comprise a major out-of-pocket expense for many elderly people covered by Medicare. According to the National Medical Care Utilization and Expenditure Survey conducted in 1980, out-of-pocket expenses for people over 65 years of age were slightly higher for prescription drugs than they were for physician's services (Howell, Corder and Dobson, 1985).

The Michigan Medicaid program furnishes comprehensive prescription drug benefits for crossovers, and trends in program spending for these benefits may provide useful indicators about trends in prescription drug spending among the broader population of elderly people. During the two-year study period, prescription drug spending per 1,000 crossovers rose 1 percent. The number of users per 1,000 crossovers remained constant, and the annual number of prescriptions per user grew slightly from 34.6 per user to 35.5 per user. The average program cost of each prescription declined 2 percent from $9.10 in 1982 to $8.90 in 1984.

The most striking aspect of these figures is the high number of prescriptions per user in the crossover population. One estimate places prescriptions per aged enrollee at 16.5 per year in 1984 (Waldo, 1987). This is in stark contrast to the rate of 35.5 prescriptions per year observed for

the crossover population. One contributing factor may be that the crossover population compares unfavorably with the remaining elderly population with respect to health status. Another likely factor is the Michigan Medicaid program's prescribing and dispensing limitations. The Michigan regulations generally restrict prescribed quantities to a one-month supply, and stipulate that a 120-day supply is the maximum that can ever be dispensed (National Pharmaceutical Council, 1983).

The stable rates of prescription drug use and spending do not support the hypothesis that PPS fostered substitution of these benefits for inpatient care. The slow growth in the average number of prescriptions per user is consistent with the trend Waldo reports among the entire population over 65 years of age (1987), and the 2 percent decline in spending per prescription indicates some limited success in the Michigan Medicaid program's efforts to control spending of this benefit.

CONCLUSIONS

The above trends in spending for alternative site care present very little indication that PPS is causing a shift of services to outpatient settings. The strongest evidence of provider impact is the 23 percent drop in inpatient hospital spending, and the closely related drop in use and spending for inpatient physician visits. Although inpatient visits fell by over 20 percent during the 1982-1984 study period, the use of physician visits in outpatient settings remained stable. The only area of visit growth in these other settings was in "other ambulatory" settings -- a category comprised primarily of outpatient psychiatric clinics.

PPS may have had other provider impacts that are not evident in these data. The HI and SMI spending trends discussed earlier in this paper and the findings of Klingman and Helsel give strong support to the thesis that Medicare enrollees are making heavier use of alternative site providers. The anomalies of crossover billing, and the confounding influence of Medicaid policy make it difficult to evaluate prospective payment's impacts on other providers based solely on crossover data. Sizeable components of Medicare spending are apparently missing from the crossover files, such that these data do not produce the complete picture of Medicare and Medicaid spending that we anticipated.

This picture can be completed only through linking Medicaid crossover files with Medicare files. Without such a link, we will continue to miss critical components of care such at second hospital admissions during a benefit period, ambulatory surgical procedures reimbursed at 100 percent by Medicare, and various SNF and home health services that are fully paid by Medicare. Even with such a link several troubling issues remain. The cost-containment efforts of the Medicaid program may influence spending patterns as much as Medicare's PPS. Changes in billing procedures have uncertain potential to shift costs from one provider category to another. Additionally, there are clear differences in the socio-demographic characteristics and health status of crossovers when compared with other Medicare enrollees, and there may be differences in the way their providers responded to PPS. Health care entrepreneurs may not be targeting low-income populations when they make plans to open alternative site care facilities. Consequently, it is possible using crossovers to evaluate the impact of PPS on alternative site providers is problematic not only due to the unique

characteristics of the crossovers but also due to the unrepresentative characteristics of their providers.

Finally, it is possible that the reduced spending we observed for alternative site providers was primarily a result of using 1984 as the "post-PPS" year. The Part A and Part B spending trends discussed at the beginning of this report did not diverge sharply until 1985. This might indicate that the response of alternative site providers to PPS incentives was most pronounced after 1984. Perhaps these providers needed time to fully understand PPS, change their practice patterns and open new facilities. It is noteworthy that many Michigan hospitals did not come under Medicare's prospective payment system until the summer of 1984. It may be worthwhile to examine the 1985 spending patterns among crossovers to determine whether alternative site care began to expand in the first true "post-PPS" calendar year.

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APPENDIX A

Total Crossover Spending by Provider Type: 1982-1984
(1982 Dollars)

LONG TERM CARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	1,274,766.52	124.80	267.37	38.20
1984 SPENDING	1,236,612.05	116.43	275.31	38.58
1982/84 % CHANGE	-2.99	-6.70	2.97	0.98

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	377,002.91	75.58	139.73	35.70
1984 SPENDING	454,545.79	95.24	126.46	37.74
1982/84 % CHANGE	20.57	26.01	-9.50	5.72

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	816,429.30	89.28	250.86	35.33
1984 SPENDING	594,124.07	63.92	256.58	36.23
1982/84 % CHANGE	-27.23	-28.41	-0.88	2.55

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	1,286,880.42	132.86	267.36	36.23
1984 SPENDING	1,370,946.44	128.00	293.22	36.53
1982/84 % CHANGE	6.53	-3.66	9.67	0.82

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	1,312,520.85	162.62	225.03	35.87
1984 SPENDING	1,710,416.61	180.30	258.34	36.72
1982/84 % CHANGE	30.32	10.87	14.80	2.38

HOSPITAL INPATIENT SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	1,801,586.10	310.44	16.42	353.49
1984 SPENDING	1,385,795.19	274.44	11.84	426.54
1982/84 % CHANGE	-23.08	-11.60	-27.89	20.67

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	4,457,709.30	668.60	18.07	369.06
1984 SPENDING	3,759,652.01	608.06	12.57	491.80
1982/84 % CHANGE	-15.66	-9.06	-30.41	33.26

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	1,865,538.72	299.08	16.33	382.08
1984 SPENDING	1,441,257.77	270.22	11.33	470.64
1982/84 % CHANGE	-22.74	-9.65	-30.58	23.18

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	2,224,386.31	351.83	18.15	348.41
1984 SPENDING	1,666,986.02	320.01	12.07	431.45
1982/84 % CHANGE	-25.06	-9.05	-33.46	23.83

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	4,154,906.39	556.26	20.42	365.87
1984 SPENDING	3,423,754.99	538.63	13.40	474.38
1982/84 % CHANGE	-17.60	-3.17	-34.37	29.66

PHYSICIAN SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR GALL BLADDER PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	629,607.56	645.35	20.03	48.70
OFFICE	372,337.21	895.35	8.96	46.39
NURSING HOME	9,811.05	87.21	4.73	23.77
OTHER AMBULATORY	68,962.21	383.72	2.73	65.90
HOSPITAL OPD	26,622.09	311.05	1.61	53.24
HOSPITAL ER	3,470.93	90.12	1.16	33.17
HOME	2,215.12	37.79	1.62	36.29
ALL PHYSICIANS	1,113,026.16	994.19	23.21	48.23

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	553,245.42	597.07	15.67	59.11
OFFICE	252,282.05	908.42	9.04	30.71
NURSING HOME	12,655.68	95.24	5.46	24.33
OTHER AMBULATORY	62,512.82	542.12	2.60	44.33
HOSPITAL OPD	42,278.39	355.31	1.61	73.99
HOSPITAL ER	1,677.66	84.25	1.26	15.79
HOME	300.37	10.99	1.67	16.40
ALL PHYSICIANS	924,952.38	992.67	20.35	45.79

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	-12.13	-7.48	-21.75	21.37
OFFICE	-32.24	1.46	0.89	-33.81
NURSING HOME	28.99	9.21	15.38	2.37
OTHER AMBULATORY	-9.35	41.28	-4.62	-32.73
HOSPITAL OPD	58.81	14.23	0.05	38.96
HOSPITAL ER	-51.67	-6.51	8.57	-52.38
HOME	-86.44	-70.92	3.17	-54.80
ALL PHYSICIANS	-16.90	-0.15	-12.38	-5.06

PHYSICIAN SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR THE TOTAL STUDY POPULATION

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	197,814.98	275.07	16.73	43.00
OFFICE	185,643.14	770.50	6.76	35.62
NURSING HOME	23,360.91	126.74	7.61	24.21
OTHER AMBULATORY	20,518.60	186.96	2.13	51.60
HOSPITAL OPD	17,178.15	158.97	1.67	64.88
HOSPITAL ER	1,907.36	48.28	1.21	32.56
HOME	1,427.09	21.82	2.46	26.55
ALL PHYSICIANS	447,850.24	923.70	12.51	38.77

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	156,331.44	252.27	14.25	43.49
OFFICE	166,732.00	786.38	6.67	31.81
NURSING HOME	20,879.14	130.19	7.37	21.76
OTHER AMBULATORY	21,778.63	250.77	2.07	41.88
HOSPITAL OPD	18,864.20	148.49	1.57	81.15
HOSPITAL ER	1,128.09	44.34	1.20	21.24
HOME	1,097.11	18.26	2.34	25.68
ALL PHYSICIANS	386,810.61	931.71	11.42	36.34

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	-20.97	-8.29	-14.81	1.15
OFFICE	-10.19	2.06	-1.45	-10.70
NURSING HOME	-10.62	2.72	-3.19	-10.13
OTHER AMBULATORY	6.14	34.13	-2.51	-18.83
HOSPITAL OPD	9.82	-6.59	-6.00	25.07
HOSPITAL ER	-40.86	-8.14	-1.29	-34.77
HOME	-23.12	-16.31	-5.04	-3.27
ALL PHYSICIANS	-13.63	0.87	-8.65	-6.26

PHYSICIAN SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR HYPERTENSION PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	207,742.33	274.95	17.42	43.38
OFFICE	257,448.61	864.42	7.94	37.52
NURSING HOME	23,616.27	101.48	8.55	27.20
OTHER AMBULATORY	23,805.18	190.02	2.35	53.27
HOSPITAL OPD	15,143.99	155.08	1.84	53.08
HOSPITAL ER	1,658.96	41.87	1.20	33.00
HOME	1,303.05	25.51	1.85	27.65
ALL PHYSICIANS	530,718.39	987.06	13.52	39.76

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	165,545.87	252.64	15.27	42.92
OFFICE	228,047.81	880.32	8.00	32.40
NURSING HOME	13,937.96	82.64	7.59	22.21
OTHER AMBULATORY	21,780.00	246.89	2.19	40.37
HOSPITAL OPD	18,337.48	147.30	1.61	77.36
HOSPITAL ER	1,147.71	42.89	1.21	22.16
HOME	1,354.53	21.24	2.32	27.49
ALL PHYSICIANS	450,151.38	958.26	12.94	36.30

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	-20.31	-8.11	-12.34	-1.07
OFFICE	-11.42	1.84	0.72	-13.64
NURSING HOME	-40.98	-18.56	-11.22	-18.37
OTHER AMBULATORY	-8.51	29.93	-7.08	-24.22
HOSPITAL OPD	21.09	-5.02	-12.52	45.73
HOSPITAL ER	-30.82	2.45	0.54	-32.83
HOME	3.95	-16.75	25.56	-0.56
ALL PHYSICIANS	-15.18	-2.92	-4.30	-8.70

PHYSICIAN SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR DIABETES PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	254,308.95	325.09	19.13	40.89
OFFICE	270,003.70	835.02	8.49	38.07
NURSING HOME	30,696.10	145.48	8.22	25.67
OTHER AMBULATORY	25,511.94	198.12	2.43	52.98
HOSPITAL OPD	15,787.92	145.64	1.83	59.19
HOSPITAL ER	1,850.82	42.38	1.22	35.85
HOME	1,300.87	25.73	1.80	28.13
ALL PHYSICIANS	599,460.31	957.28	16.04	39.04

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	209,488.38	301.89	16.43	42.23
OFFICE	235,348.37	846.99	8.80	31.58
NURSING HOME	30,030.13	160.69	8.43	22.16
OTHER AMBULATORY	21,640.61	252.26	2.37	36.17
HOSPITAL OPD	18,632.14	147.70	1.70	74.03
HOSPITAL ER	1,043.13	44.51	1.27	18.39
HOME	1,123.47	20.09	2.06	27.17
ALL PHYSICIANS	517,306.22	972.04	15.14	35.15

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	-17.62	-7.14	-14.10	3.27
OFFICE	-12.84	1.43	3.59	-17.05
NURSING HOME	-2.17	10.46	2.59	-13.67
OTHER AMBULATORY	-15.17	27.33	-2.42	-31.73
HOSPITAL OPD	18.02	1.41	-6.96	25.08
HOSPITAL ER	-43.64	5.01	4.60	-48.69
HOME	-13.64	-21.94	14.55	-3.42
ALL PHYSICIANS	-13.70	1.54	-5.60	-9.97

PRESCRIPTION DRUG SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SCRIPTS PER USER	SPENDING PER SCRIPT
1982 SPENDING	297,711.23	950.59	34.60	8.05
1984 SPENDING	300,592.29	955.34	35.45	8.88
1982/84 % CHANGE	0.97	0.50	2.45	-1.94

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SCRIPTS PER USER	SPENDING PER SCRIPT
1982 SPENDING	336,241.28	982.56	36.50	9.38
1984 SPENDING	376,758.24	974.36	41.29	9.36
1982/84 % CHANGE	12.05	-0.83	13.13	-0.12

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SCRIPTS PER USER	SPENDING PER SCRIPT
1982 SPENDING	326,503.05	983.55	36.92	8.99
1984 SPENDING	336,278.17	986.30	38.73	8.80
1982/84 % CHANGE	2.99	0.28	4.91	-2.10

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SCRIPTS PER USER	SPENDING PER SCRIPT
1982 SPENDING	418,219.98	984.19	46.02	9.23
1984 SPENDING	448,823.16	987.79	49.82	9.12
1982/84 % CHANGE	7.32	0.37	8.26	-1.23

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SCRIPTS PER USER	SPENDING PER SCRIPT
1982 SPENDING	386,158.42	986.20	45.80	8.55
1984 SPENDING	399,349.97	980.68	47.99	8.49
1982/84 % CHANGE	3.42	-0.56	4.76	-0.73

PHYSICIAN SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR CHRONIC HEART FAILURE PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	448,134.11	522.65	22.64	37.87
OFFICE	270,634.56	829.58	8.76	37.24
NURSING HOME	42,541.25	182.72	8.54	27.27
OTHER AMBULATORY	44,961.30	302.73	2.70	54.97
HOSPITAL OPD	18,530.75	200.12	1.76	52.74
HOSPITAL ER	2,641.76	79.51	1.32	25.23
HOME	2,716.47	33.30	2.95	27.69
ALL PHYSICIANS	830,160.22	983.50	22.40	37.68

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	383,527.69	520.28	19.11	38.57
OFFICE	246,087.89	812.94	8.76	34.57
NURSING HOME	38,945.91	189.95	9.16	22.39
OTHER AMBULATORY	40,200.26	369.61	2.57	42.40
HOSPITAL OPD	18,511.91	174.18	1.77	60.21
HOSPITAL ER	1,721.18	73.41	1.36	17.19
HOME	945.91	24.15	1.80	21.76
ALL PHYSICIANS	729,940.76	979.07	20.63	36.14

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
HOSPITAL INPATIENT	-14.42	-0.45	-15.61	1.87
OFFICE	-9.07	-2.01	-0.03	-7.18
NURSING HOME	-8.45	3.96	7.25	-17.89
OTHER AMBULATORY	-10.59	22.09	-5.05	-22.87
HOSPITAL OPD	-0.10	-12.96	0.55	14.15
HOSPITAL ER	-34.85	-7.67	3.57	-31.87
HOME	-65.18	-27.49	-38.90	-21.40
ALL PHYSICIANS	-12.07	-0.45	-7.91	-4.09

HOSPITAL OUTPATIENT SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	144,806.24	445.95	10.01	32.43
1984 SPENDING	87,470.04	349.97	6.96	35.91
1982/84 % CHANGE	-39.60	-21.52	-30.49	10.73

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	185,906.98	610.47	14.64	20.80
1984 SPENDING	321,512.82	578.75	10.59	52.43
1982/84 % CHANGE	72.94	-5.19	-27.62	152.03

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	135,214.97	439.83	11.40	26.98
1984 SPENDING	89,726.96	371.90	7.85	30.73
1982/84 % CHANGE	-33.64	-15.45	-31.10	13.91

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	144,549.61	480.83	13.79	21.81
1984 SPENDING	94,982.28	395.63	9.35	25.68
1982/84 % CHANGE	-34.29	-17.72	-32.19	17.76

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	190,898.59	519.05	16.92	21.74
1984 SPENDING	131,887.31	424.02	11.35	27.42
1982/84 % CHANGE	-30.91	-18.31	-32.93	26.10

MEDICAL SUPPLIES SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	80,549.70	235.05	342.69
1984 SPENDING	96,436.92	275.99	349.43
1982/84 % CHANGE	19.72	17.41	1.97

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	83,654.07	218.02	383.69
1984 SPENDING	92,908.42	307.69	301.95
1982/84 % CHANGE	11.06	41.13	-21.30

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	59,091.68	236.23	250.15
1984 SPENDING	72,764.20	282.46	257.61
1982/84 % CHANGE	23.14	19.57	2.98

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	69,343.93	249.24	278.22
1984 SPENDING	90,255.81	295.39	305.55
1982/84 % CHANGE	30.16	18.52	9.82

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	160,846.68	279.33	575.83
1984 SPENDING	185,880.88	343.85	540.59
1982/84 % CHANGE	15.56	23.10	-6.12

TRANSPORTATION SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	25,749.67	129.88	198.26
1984 SPENDING	24,624.77	123.59	199.25
1982/84 % CHANGE	-4.37	-4.84	0.50

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	36,502.91	159.88	228.31
1984 SPENDING	22,948.72	172.16	133.30
1982/84 % CHANGE	-37.13	7.68	-41.62

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	23,320.89	113.77	204.98
1984 SPENDING	21,701.75	105.14	206.41
1982/84 % CHANGE	-6.94	-7.59	0.70

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	29,322.74	135.89	215.78
1984 SPENDING	31,859.20	133.12	239.32
1982/84 % CHANGE	8.65	-2.04	10.91

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	52,863.79	233.12	226.76
1984 SPENDING	55,503.54	234.39	236.80
1982/84 % CHANGE	4.99	0.54	4.43

LAB AND XRAY SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	46,409.19	347.83	133.43
1984 SPENDING	23,186.70	275.31	84.22
1982/84 % CHANGE	-50.04	-20.85	-36.88

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	69,476.74	418.60	165.97
1984 SPENDING	27,798.53	355.31	78.24
1982/84 % CHANGE	-59.99	-15.12	-52.86

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	72,932.90	424.86	171.66
1984 SPENDING	33,287.16	335.91	99.09
1982/84 % CHANGE	-54.36	-20.94	-42.27

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	83,033.30	475.28	174.70
1984 SPENDING	42,142.97	422.41	99.77
1982/84 % CHANGE	-49.25	-11.12	-42.89

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	75,109.51	444.04	169.15
1984 SPENDING	39,022.54	358.02	109.00
1982/84 % CHANGE	-48.05	-19.37	-35.56

HOME HEALTH SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	19,573.13	16.44	1,190.22
1984 SPENDING	12,128.49	11.90	1,019.52
1982/84 % CHANGE	-38.03	-27.66	-14.34

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	21,029.07	17.44	1,205.67
1984 SPENDING	1,600.73	7.33	218.50
1982/84 % CHANGE	-92.39	-58.00	-81.88

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	17,889.93	14.33	1,248.83
1984 SPENDING	9,277.43	10.15	914.26
1982/84 % CHANGE	-48.14	-29.16	-26.79

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	29,999.50	23.38	1,283.29
1984 SPENDING	17,456.09	17.33	1,007.30
1982/84 % CHANGE	-41.81	-25.87	-21.51

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	28,922.29	26.70	1,083.12
1984 SPENDING	17,283.64	20.61	838.80
1982/84 % CHANGE	-40.24	-22.83	-22.56

NO P

PODIATRIST SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	21,502.67	124.03	173.36
1984 SPENDING	22,261.44	156.94	141.84
1982/84 % CHANGE	3.53	26.54	-18.18

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	15,197.67	90.12	168.65
1984 SPENDING	17,369.96	124.54	139.47
1982/84 % CHANGE	14.29	38.20	-17.30

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	23,341.96	127.73	182.75
1984 SPENDING	24,766.61	150.96	164.06
1982/84 % CHANGE	6.10	18.19	-10.22

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	32,574.17	171.21	190.26
1984 SPENDING	33,900.95	214.65	157.93
1982/84 % CHANGE	4.07	25.37	-16.99

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	20,494.45	128.11	159.97
1984 SPENDING	25,182.87	179.97	139.92
1982/84 % CHANGE	22.88	40.48	-12.53

INPATIENT PSYCHIATRIC SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	7,294.62	1.43	30.03	170.46
1984 SPENDING	12,424.55	2.06	23.83	253.73
1982/84 % CHANGE	70.32	44.20	-20.64	48.85

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	4,084.30	2.91	5.00	281.00
1984 SPENDING	0.00	0.00	.	.
1982/84 % CHANGE	-100.00	-100.00	.	.

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	5,550.65	1.11	25.67	194.99
1984 SPENDING	14,168.43	1.57	25.60	352.70
1982/84 % CHANGE	155.26	41.49	-0.26	80.88

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	9,686.85	1.51	38.11	167.92
1984 SPENDING	5,210.12	1.18	19.67	224.21
1982/84 % CHANGE	-46.21	-21.94	-48.40	33.52

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	DAYS PER USER	SPENDING PER DAY
1982 SPENDING	9,432.34	1.50	33.60	187.13
1984 SPENDING	8,826.46	2.25	14.14	276.92
1982/84 % CHANGE	-6.42	50.23	-57.91	47.98

OTHER PRACTITIONER SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	8,888.69	154.07	9.38	6.15
1984 SPENDING	9,708.20	153.43	10.20	6.21
1982/84 % CHANGE	9.22	-0.42	8.76	0.84

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	15,752.91	171.51	14.19	6.47
1984 SPENDING	7,772.89	183.15	18.46	2.30
1982/84 % CHANGE	-50.66	6.79	30.12	-64.49

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	7,509.24	163.68	9.88	4.64
1984 SPENDING	10,047.81	170.21	11.24	5.25
1982/84 % CHANGE	33.81	3.99	13.76	13.11

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	11,915.57	169.02	12.30	5.73
1984 SPENDING	13,641.39	172.31	13.04	6.07
1982/84 % CHANGE	14.48	1.95	5.98	5.96

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	9,111.01	149.71	15.00	4.06
1984 SPENDING	7,057.63	145.52	17.05	2.84
1982/84 % CHANGE	-22.54	-2.80	13.64	-29.87

OTHER AMBULATORY SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	3,671.72	41.95	11.48	7.62
1984 SPENDING	24,700.70	56.91	12.45	34.86
1982/84 % CHANGE	572.73	35.66	8.43	357.35

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	2,848.84	34.88	15.75	5.19
1984 SPENDING	28,897.44	69.60	16.89	24.58
1982/84 % CHANGE	914.36	99.51	7.27	373.97

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	3,943.16	41.31	12.06	7.91
1984 SPENDING	13,666.28	46.24	13.61	21.71
1982/84 % CHANGE	246.58	11.93	12.83	174.44

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	4,199.97	40.20	13.78	7.58
1984 SPENDING	20,176.25	50.61	16.26	24.51
1982/84 % CHANGE	380.39	25.91	18.01	223.30

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	VISITS PER USER	SPENDING PER VISIT
1982 SPENDING	5,971.20	51.31	18.48	6.30
1984 SPENDING	16,939.15	52.48	21.60	14.95
1982/84 % CHANGE	183.68	2.29	16.86	137.32

APPENDIX B

Medicare Component of Crossover Spending
by Provider Type: 1982-1984
(1982 Dollars)

LONG TERM CARE MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	6,357.84	14.98	424.332
1984 SPENDING	3,167.73	10.35	305.916
1982/84 % CHANGE	-50.18	-30.89	-27.906

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	787.55	3.66	215
1982/84 % CHANGE	.	.	.

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	4,598.98	8.69	529.372
1984 SPENDING	1,006.07	3.87	259.919
1982/84 % CHANGE	-78.12	-55.45	-50.901

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	7,519.68	15.14	496.800
1984 SPENDING	1,196.14	6.50	184.061
1982/84 % CHANGE	-84.09	-57.07	-62.951

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	4,904.89	15.30	320.549
1984 SPENDING	1,825.50	10.95	166.765
1982/84 % CHANGE	-62.78	-28.46	-47.975

HOSPITAL INPATIENT MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	1,614,210.13	301.13	5360.59
1984 SPENDING	1,195,752.31	259.74	4603.61
1982/84 % CHANGE	-25.92	-13.74	-14.12

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	4,057,566.86	645.35	6287.40
1984 SPENDING	3,231,219.78	564.10	5728.07
1982/84 % CHANGE	-20.37	-12.59	-8.90

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	1,676,467.56	290.94	5762.19
1984 SPENDING	1,238,409.35	255.47	4847.65
1982/84 % CHANGE	-26.13	-12.19	-15.87

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	1,978,953.92	341.24	5799.34
1984 SPENDING	1,415,920.28	300.12	4715.90
1982/84 % CHANGE	-28.48	-12.05	-18.68

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	3,767,583.86	540.35	6972.44
1984 SPENDING	2,935,553.77	510.62	5748.95
1982/84 % CHANGE	-22.08	-5.50	-17.55

PHYSICIAN MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR GALL BLADDER PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	494,813.95	630.81	784.41
OFFICE	271,848.84	863.37	314.87
NURSING HOME	6,578.49	81.40	80.82
OTHER AMBULATORY	53,744.19	366.28	146.73
HOSPITAL OPD	19,122.09	264.53	72.29
HOSPITAL ER	2,607.56	81.40	32.04
HOME	1,279.07	17.44	73.33
ALL PHYSICIANS	849,994.19	988.37	859.99

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	438,201.47	593.41	738.45
OFFICE	185,692.31	860.81	215.72
NURSING HOME	8,882.78	87.91	101.04
OTHER AMBULATORY	49,406.59	520.15	94.99
HOSPITAL OPD	33,329.67	333.33	99.99
HOSPITAL ER	1,216.12	80.59	15.09
HOME	241.76	10.99	22.00
ALL PHYSICIANS	716,970.70	981.68	730.35

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	-11.44	-5.93	22.32
OFFICE	-31.69	-0.30	-33.27
NURSING HOME	35.03	8.01	7.16
OTHER AMBULATORY	-8.07	42.01	-31.78
HOSPITAL OPD	74.30	26.01	52.51
HOSPITAL ER	-53.36	-0.99	-54.05
HOME	-81.10	-37.00	-37.00
ALL PHYSICIANS	-15.65	-0.68	-3.64

PHYSICIAN MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR THE TOTAL STUDY POPULATION

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	154,727.74	271.23	570.46
OFFICE	127,181.81	729.68	174.30
NURSING HOME	15,981.62	121.11	131.96
OTHER AMBULATORY	15,392.38	170.33	90.37
HOSPITAL OPD	12,953.55	140.00	92.52
HOSPITAL ER	1,420.44	43.23	32.86
HOME	918.94	15.46	59.45
ALL PHYSICIANS	328,576.49	894.90	367.17

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	123,520.75	249.66	494.75
OFFICE	116,156.55	755.16	153.82
NURSING HOME	14,542.25	126.00	115.42
OTHER AMBULATORY	16,852.58	235.32	71.62
HOSPITAL OPD	14,513.67	131.53	110.34
HOSPITAL ER	826.26	40.59	20.36
HOME	768.52	16.28	47.20
ALL PHYSICIANS	287,180.58	912.97	314.56

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	-20.17	-7.95	2.18
OFFICE	-8.67	3.49	-9.20
NURSING HOME	-9.01	4.04	-8.50
OTHER AMBULATORY	9.49	38.15	-16.28
HOSPITAL OPD	12.04	-6.05	27.61
HOSPITAL ER	-41.83	-6.11	-35.85
HOME	-16.37	5.34	5.29
ALL PHYSICIANS	-12.60	2.02	-5.15

PHYSICIAN MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR DIABETES PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	199,712.75	321.39	621.40
OFFICE	190,918.43	805.42	237.04
NURSING HOME	21,640.60	139.93	154.66
OTHER AMBULATORY	19,383.28	184.66	104.97
HOSPITAL OPD	11,913.89	129.67	91.88
HOSPITAL ER	1,405.15	38.35	36.64
HOME	852.84	17.49	48.76
ALL PHYSICIANS	445,826.94	935.76	476.44

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	166,359.59	298.94	556.50
OFFICE	167,802.68	827.29	202.83
NURSING HOME	21,515.75	157.74	136.40
OTHER AMBULATORY	16,867.07	238.28	70.79
HOSPITAL OPD	14,399.17	131.55	109.46
HOSPITAL ER	794.01	41.55	19.11
HOME	833.60	17.13	48.66
ALL PHYSICIANS	388,571.88	961.60	404.09

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	-16.70	-6.99	4.43
OFFICE	-12.11	2.72	-16.36
NURSING HOME	-0.58	12.73	-12.26
OTHER AMBULATORY	-12.98	29.04	-29.97
HOSPITAL OPD	20.86	1.45	20.09
HOSPITAL ER	-43.49	8.86	-48.56
HOME	-2.26	-2.05	9.31
ALL PHYSICIANS	-12.84	2.76	-9.07

PHYSICIAN MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR HYPERTENSION PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	162,851.57	271.44	599.95
OFFICE	179,370.70	835.03	214.81
NURSING HOME	16,616.54	97.87	169.77
OTHER AMBULATORY	18,026.71	175.97	102.44
HOSPITAL OPD	11,454.07	138.08	82.95
HOSPITAL ER	1,244.45	37.62	33.08
HOME	788.35	16.27	48.47
ALL PHYSICIANS	390,352.40	968.85	402.90

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	131,872.69	250.76	525.90
OFFICE	160,709.17	858.25	187.25
NURSING HOME	9,994.87	80.13	124.73
OTHER AMBULATORY	16,916.83	235.07	71.97
HOSPITAL OPD	14,196.78	133.80	106.10
HOSPITAL ER	853.44	39.54	21.58
HOME	977.51	19.46	50.24
ALL PHYSICIANS	335,521.29	946.33	354.55

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	-19.02	-7.62	0.53
OFFICE	-10.40	2.78	-12.65
NURSING HOME	-39.85	-18.18	-16.81
OTHER AMBULATORY	-6.16	33.58	-22.27
HOSPITAL OPD	23.95	-3.10	49.17
HOSPITAL ER	-31.42	5.13	-33.42
HOME	23.99	19.62	18.61
ALL PHYSICIANS	-14.05	-2.32	-7.48

PRESCRIPTION DRUG MEDICARE SPENDING PER 1000 CROSSOVERS*
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	.	.	.

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	.	.	.

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	.	.	.

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	.	.	.

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	.	.	.

* Medicare does not cover prescription drugs

PHYSICIAN MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

FOR CHRONIC HEART FAILURE PATIENTS

YEAR =1982

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	352,049.50	518.75	678.65
OFFICE	194,698.77	803.78	242.23
NURSING HOME	31,098.41	178.82	173.91
OTHER AMBULATORY	34,444.94	288.03	119.59
HOSPITAL OPD	14,020.10	182.12	76.98
HOSPITAL ER	2,030.00	74.11	27.39
HOME	1,758.18	25.50	68.94
ALL PHYSICIANS	630,099.91	973.00	647.59

YEAR =1984

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	302,368.00	515.45	586.61
OFFICE	180,324.86	792.34	227.59
NURSING HOME	28,236.32	187.38	150.69
OTHER AMBULATORY	31,420.80	355.12	88.48
HOSPITAL OPD	14,386.03	160.33	89.72
HOSPITAL ER	1,301.35	70.19	18.54
HOME	685.45	22.22	30.86
ALL PHYSICIANS	558,722.79	971.67	575.01

YEAR =1982-1984 PERCENT CHANGE

PLACE OF SERVICE	PHYSICIAN SPENDING / 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER VISIT
HOSPITAL INPATIENT	-14.11	-0.64	2.29
OFFICE	-7.38	-1.42	-5.46
NURSING HOME	-9.20	4.79	-18.57
OTHER AMBULATORY	-8.78	23.29	-21.31
HOSPITAL OPD	2.61	-11.96	17.25
HOSPITAL ER	-35.89	-5.29	-32.96
HOME	-61.01	-12.89	-12.00
ALL PHYSICIANS	-11.33	-0.14	-9.28

MEDICAL SUPPLIES MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	53,510.34	78.75	679.47
1984 SPENDING	65,772.19	109.24	602.09
1982/84 % CHANGE	22.91	38.71	-11.39

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	57,979.65	81.40	712.32
1984 SPENDING	60,139.19	120.88	497.52
1982/84 % CHANGE	3.72	48.51	-30.16

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	37,162.94	69.04	538.29
1984 SPENDING	47,613.66	94.68	502.92
1982/84 % CHANGE	28.12	37.13	-6.57

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	45,299.36	84.59	535.49
1984 SPENDING	60,887.75	114.02	534.00
1982/84 % CHANGE	34.41	34.79	-0.28

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	114,629.76	134.11	854.72
1984 SPENDING	133,768.19	181.26	737.98
1982/84 % CHANGE	16.70	35.16	-13.66

HOSPITAL OUTPATIENT MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	104,876.99	397.35	263.943
1984 SPENDING	63,741.72	313.69	203.199
1982/84 % CHANGE	-39.22	-21.05	-23.014

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	135,813.95	587.21	231.287
1984 SPENDING	246,868.13	553.11	446.325
1982/84 % CHANGE	81.77	-5.81	92.974

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	96,893.90	391.87	247.262
1984 SPENDING	64,968.09	335.18	193.830
1982/84 % CHANGE	-32.95	-14.47	-21.610

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	103,485.37	433.23	238.868
1984 SPENDING	68,703.62	348.96	196.883
1982/84 % CHANGE	-33.61	-19.45	-17.577

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	141,258.08	479.15	294.811
1984 SPENDING	98,465.23	389.89	252.546
1982/84 % CHANGE	-30.29	-18.63	-14.336

TRANSPORTATION MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	19,517.58	126.96	153.74
1984 SPENDING	18,987.95	122.60	154.88
1982/84 % CHANGE	-2.71	-3.43	0.74

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	28,311.05	156.98	180.35
1984 SPENDING	18,109.89	168.50	107.48
1982/84 % CHANGE	-36.03	7.34	-40.41

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	17,956.47	111.46	161.10
1984 SPENDING	16,847.68	104.40	161.37
1982/84 % CHANGE	-6.17	-6.33	0.17

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	22,536.16	133.20	169.19
1984 SPENDING	24,997.44	131.94	189.46
1982/84 % CHANGE	10.92	-0.94	11.98

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	40,530.45	228.92	177.05
1984 SPENDING	43,255.31	232.13	186.34
1982/84 % CHANGE	6.72	1.40	5.25

LAB AND XRAY MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	32,919.02	314.10	104.80
1984 SPENDING	14,781.48	227.45	64.99
1982/84 % CHANGE	-55.10	-27.59	-37.99

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	52,061.05	386.63	134.65
1984 SPENDING	18,498.17	278.39	66.45
1982/84 % CHANGE	-64.47	-28.00	-50.65

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	52,991.96	388.82	136.29
1984 SPENDING	21,924.05	284.34	77.11
1982/84 % CHANGE	-58.63	-26.87	-43.43

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	60,456.61	443.32	136.37
1984 SPENDING	27,793.82	361.76	76.83
1982/84 % CHANGE	-54.03	-18.40	-43.66

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	55,139.51	415.24	132.79
1984 SPENDING	26,737.60	317.13	84.31
1982/84 % CHANGE	-51.51	-23.63	-36.51

HOME HEALTH MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	3.07	0.07	42.00
1984 SPENDING	11.18	0.04	283.00
1982/84 % CHANGE	264.36	-45.93	573.81

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	.	.	.

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	3.88	0.09	42.00
1984 SPENDING	29.61	0.10	283.00
1982/84 % CHANGE	662.70	13.19	573.81

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	55.73	0.20	283.00
1982/84 % CHANGE	.	.	.

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	0.00	0.00	0.00
1984 SPENDING	91.11	0.32	283.00
1982/84 % CHANGE	.	.	.

PODIATRIST MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	15,307.08	116.50	131.39
1984 SPENDING	15,843.89	149.04	106.31
1982/84 % CHANGE	3.51	27.93	-19.09

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	11,427.33	81.40	140.39
1984 SPENDING	12,172.16	113.55	107.19
1982/84 % CHANGE	6.52	39.51	-23.65

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	17,163.77	121.81	140.90
1984 SPENDING	18,229.63	144.89	125.82
1982/84 % CHANGE	6.21	18.95	-10.71

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	23,923.98	162.97	146.80
1984 SPENDING	24,854.86	207.76	119.63
1982/84 % CHANGE	3.89	27.49	-18.51

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	15,217.82	122.11	124.62
1984 SPENDING	18,504.51	174.82	105.85
1982/84 % CHANGE	21.60	43.17	-15.07

INPATIENT PSYCHIATRIC MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	6,601.05	1.35	4881.92
1984 SPENDING	7,657.18	1.42	5381.72
1982/84 % CHANGE	16.00	5.23	10.24

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	3,322.67	2.91	1143
1984 SPENDING	0.00	0.00	0.00
1982/84 % CHANGE	-100.00	-100.00	.

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	5,259.43	1.02	5173.36
1984 SPENDING	9,913.28	1.05	9476.10
1982/84 % CHANGE	88.49	2.90	83.17

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	9,315.67	1.51	6154.56
1984 SPENDING	1,675.86	0.59	2836.67
1982/84 % CHANGE	-82.01	-60.97	-53.91

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	9,036.90	1.50	6024.00
1984 SPENDING	7,789.44	2.25	3456.29
1982/84 % CHANGE	-13.80	50.23	-42.62

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OTHER PRACTITIONER MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	3,604.88	19.48	185.073
1984 SPENDING	4,338.49	17.98	240.980
1982/84 % CHANGE	20.21	-7.68	30.208

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	8,552.33	14.53	588.400
1984 SPENDING	2,542.12	29.30	86.750
1982/84 % CHANGE	-70.28	101.61	-85.257

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	2,271.35	17.01	133.565
1984 SPENDING	4,232.14	17.05	248.190
1982/84 % CHANGE	86.33	0.27	85.819

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	5,754.46	22.03	261.191
1984 SPENDING	7,153.01	18.51	386.415
1982/84 % CHANGE	24.30	-15.98	47.944

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	4,034.50	18.60	216.887
1984 SPENDING	2,439.15	14.17	172.182
1982/84 % CHANGE	-39.54	-23.85	-20.612

OTHER AMBULATORY MEDICARE SPENDING PER 1000 CROSSOVERS
AND ITS COMPONENTS: 1982 - 1984
(1982 DOLLARS)

GROUP=TOTAL STUDY POPULATION

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	1,555.22	18.67	83.282
1984 SPENDING	1,329.74	21.62	61.508
1982/84 % CHANGE	-14.50	15.77	-26.144

GROUP=GALL BLADDER PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	1,127.91	14.53	77.600
1984 SPENDING	1,505.49	29.30	51.375
1982/84 % CHANGE	33.48	101.61	-33.795

GROUP=HYPERTENSION PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	1,835.49	21.16	86.7249
1984 SPENDING	1,726.96	19.35	89.2324
1982/84 % CHANGE	-5.91	-8.56	2.8914

GROUP=DIABETES PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	2,078.04	18.16	114.407
1984 SPENDING	656.36	16.35	40.157
1982/84 % CHANGE	-68.41	-10.01	-64.900

GROUP=CHF PATIENTS

YEAR	SPENDING PER 1000 CROSSOVERS	USERS PER 1000 CROSSOVERS	SPENDING PER USER
1982 SPENDING	3,185.81	26.40	118.750
1984 SPENDING	754.35	18.35	41.105
1982/84 % CHANGE	-75.94	-30.49	-65.385

APPENDIX C

Deflators Used to Adjust 1984 Expenditures to 1982 Dollars

APPENDIX C

Deflators Used to Adjust 1984 Expenditures to 1982 Dollars

Service Category	Deflator	Source
Physician	.8681	Physicians' services component of medical care CPI*
Podiatrist	.8681	Physicians' services component of medical care CPI
Other Practitioners	.9024	Other professional services component of medical care CPI
Acute Inpatients	.8844	Hospital marketbasket (DRI, "Health Care Costs")**
Outpatient Hospital	.8844	Hospital marketbasket (DRI, "Health Care Costs")
Other Ambulatory	.8645	Other medical care services of medical care CPI
Inpatient Psych	.9038	SNF marketbasket (DRI, "Health Care Costs")
LTC	.9038	SNF marketbasket (DRI, "Health Care Costs")
Home Health	.8836	Home Health marketbasket (DRI, "Health Care Costs")
Pharmacy	.8224	Prescription drug component of medical care CPI
Lab/X-Ray	.8645	Other medical care services of medical care CPI
Suppliers	.8645	Other medical care services of medical care CPI
Transportation	.8645	Other medical care services of medical care CPI

* U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index for all Urban Consumers, U.S. City Average

** Data Resources, Inc. Health Care Costs. National Historical Data Third Quarter 1987 Series.

APPENDIX D

Technical Note on File Construction

TECHNICAL NOTE ON FILE CONSTRUCTION

In constructing the crossover data files for this study it was necessary to make a variety of decisions concerning the parameters of the study population, definition of provider categories and identification of place of service. This technical note summarizes the decisions that were made.

As described in the text and Table 1, the fundamental criteria for defining a crossover were that the individual was at least 65 years of age, and had at least one crossover claim in the Medicaid file indicating a Medicare amount paid greater than zero. In defining the study population we also eliminated any crossovers not continuously enrolled for the entire year and any who received ASC procedures or were medically needy. These constraints were imposed in order to ensure that the individuals in the study population were indeed enrolled in Medicare; that the absence of claims paid 100 percent by Medicare did not bias our findings; and that the population ras not overly representative of medically needy people.

In addition to these conceptual criteria, we performed a variety of data edits to ensure that people in the study population were actually crossovers who received fee-for-service care. We eliminated the following categories of people from the analytical data set:

-- AFDC enrollees

-- non-recipients

-- HMO enrollees

-- refugees, state only and federal only enrollees

-- individuals with psychiatric days of discharges associated with services to enrollees under age 21

All claims for the remaining enrollees were pulled from inpatient, outpatient and LTC/home health files and person-level use and spending profiles were constructed. These person-level profiles included details on the use of services by provider type, place of service, total provider reimbursements and provider reimbursements by Medicare. Prescription drug use and spending information was taken from the Early Returns file. Because prescription drugs are not reimbursed by Medicare and all benefits for this service are associated with the provider type "pharmacy," it was not necessary to engage in extensive file manipulation to obtain the necessary person-level information about prescription drug spending.

Exhibit D-1 summarizes the logic used in defining place of service. In general terms, we examined the place of service reported on the claim and recoded it only when other information on the claims suggested that it was inaccurate or inconsistent with our classification scheme. Providers who do not have face-to-face contact with patients were assigned a place of service of "other." These included such providers as lab/X-ray, ambulance and suppliers of durable medical equipment. Considerable effort went into distinguishing between services provided in hospital emergency rooms and services provided in hospital outpatient departments. We concluded that we could classify physician service into these two settings based on the absence of presence of an emergency room facility charge on the same day a physician saw the patients in a hospital outpatient setting.

Patients with tracer conditions examined for this study were required to have at least one claim with an ICD-9-CM code associated with the tracer. The tracer conditions and associated ICD-9-CM codes are as follows:

	ICD-9-CM CODES
Essential hypertension	401-- through 404--
Diabetes mellitus	250--
Gall bladder disease	575--
Congestive heart failure	428.0

EXHIBIT D-1

PPS Place of Service Recode

PPS Variable Place		Uniform Claims Variables SERVPL	SERVCODE	PROVTYPE	Comments
1	Office	1	-	-	
2	Home	2	-	-	
3	Hospital	3	-	-	
4	NH	4	-	-	
5	OPD	-	Any but 069032	307	
5	OPD	5,6,9	-	100	If same service date as other provider types 307 with PLACE=5
6	ER	-	069032	307	
6	ER	-	-	307	If same service date as other provider types 307 with PLACE=6
6	ER	5,6,9	-	100	If same service date as other provider types 307 with PLACE=6
8	Other Amb	9	-	205,206, 303,309, 208,308	
9	Other	-	-	700-999	

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PROSPECTIVE PAYMENT AND ANALYTIC SUPPORT STUDIES

Competition and the Response of Alternative Health Plans (AHPs) Impact of the PPS on AHPs and their Availability to Medicare and Non-Medicare Beneficiaries

TECHNICAL REPORT

June 11, 1987

Contract No. 500-85-0015

Submitted to:

Tim Greene
Office of Research
Health Care Financing Administration
Baltimore, MD 21207

An Equal Opportunity Employer

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Executive Summary

Federal government interest in Medicare capitation and beneficiary enrollment in HMOs is growing rapidly among public policymakers as an alternative to the fee-for-service sector. This study, conducted by Abt Associates as part of the National Prospective Payment System Evaluation for the Health Care Financing Administration, examines recent changes in competition in the financing and delivery of health care through investigation of the relationship of Medicare's Prospective Payment System (PPS) to changes in markets for alternative health plans (AHPs), specifically, health maintenance organizations (HMOs). Traditionally, such plans have enjoyed competitive advantage over fee-for-service providers due to their ability to reduce hospital utilization, to promote efficient and managed use of services per beneficiary, and to negotiate favorable rates with and relative to other area providers.

The following research questions are explored at the plan and county levels to identify and describe changes in the financing and delivery of health services in HMOs, and the availability of these capitation plans to Medicare and non-Medicare populations that may be related to the PPS.

- Has the PPS altered the means through which HMOs achieve comparative advantage in health insurance markets, resulting in organizational changes in the industry?
- Has the PPS affected the markets in which HMOs operate, and the competitive position of HMOs within those markets?
- Have HMOs altered their behavior in response to these PPS-related changes, both with respect to handling of patients and competitive strategies?
- What is the relationship between the PPS, competition, and comparative advantage for HMOs, and how has this affected Medicare and non-Medicare beneficiary access to HMO alternatives to fee-for-service health care?

These areas have been examined through descriptive analysis of secondary data of hospital and non-hospital provider supply, enrollment data, basic plan

characteristics, demographic and utilization features of the plan service area, and indepth small area case studies of HMO behavior. Key findings are summarized below.

1. There has been tremendous growth in numbers of HMOs and plan enrollments during the 1980-85 period, from 233 plans in 1980 to 472 plans in 1985. HMO enrollment increased 115% during this period, slightly above the rate of increase in numbers of plans (103%).

2. Most of this growth has occurred in previously served urban markets, increasing choice of plans in these areas. These areas tend to have higher per capita incomes, higher health care costs, utilization and supply of providers, and more highly competitive hospital markets. Growth has also occurred in previously unserved areas. In 1985, 23% of the population resided in counties without HMOs, down from 40% in 1980. The percent of plans serving rural areas remains constant at 9% of all plans in 1980 and 1985.

3. Recent rapid growth of network and IPA models suggests that the comparative advantage of these types of plans has improved relative to staff and group model plans. This may indicate that HMOs are competing and positioning themselves with the fee-for-service sector in different ways; the utilization control advantages enjoyed in the past by staff and group model HMOs are dissipating as hospital utilization falls nationwide, and are being replaced by the comparative advantages of monopsony leverage in the marketplace enjoyed by the larger network organizations. The PPS effect on utilization may have been important in changing the relative advantages of different types of HMOs.

4. Medicare enrollment in HMOs under risk, cost or other arrangements has increased from 379,770 in 1980 to 861,807 in 1985, at a rate similar to that reported for employee groups. Medicare enrollment as a percentage of total plan enrollment has not increased substantially during this period. Networks and IPA models were more likely than other plan types to enroll Medicare beneficiaries under risk contracts. In 1985, 27% of Medicare beneficiaries lived in counties not served by HMOs, down from 42% in 1980.

5. Plan participation with Medicare varies across markets, with 90% of all plans with Medicare enrollees under risk contracts located in counties with the highest AAPCC rates.

6. Neither expected PPS "gain" for hospitals, aggregated to the county level, nor the variability in "gain" across hospitals were significantly related to HMO penetration at the county level. However, variability in PPS "gain" is higher in counties with

longstanding HMOs, and in counties with the most rapid HMO growth. If HMOs tend to flourish in markets with varied hospital cost structures then the homogenizing effects of PPS could stem some of the potential HMO growth.

7. From market case studies we learned that the industry regards the Medicare capitation initiative with skepticism. Too little is understood about plan utilization and cost for seniors and changes perceived for future HCFA rates.
8. Case studies also showed that there was an expressed need to provide beneficiaries with information about their Medicare benefits in HMOs and in the fee-for-service sector.

9. Large employers (more than 1,000 employees) do not tend to distinguish counties served by HMOs with Medicare enrollment under risk contracts, which are more likely to be in high AAPCC areas, but tend to be located in areas with lower AAPCC rates, where HMOs have been more reluctant to enter into risk contracting arrangements. Availability of risk membership is likely to be limited to age-in or retiree groups in these areas unless alternatives to the AAPCC as a contracting requirement are used.

Competition and the Response of Alternative Health Plans (AHPs)
to Medicare's Prospective Payment System (PPS):
Impact of the PPS on AHPs and their Availability
to Medicare and Non-Medicare Beneficiaries
(DRAFT TECHNICAL REPORT: Year 1)

1.0 Introduction

Competitive market strategies as a way of achieving economic efficiency have marked federal policy in health care throughout most of the decade. Like virtually every other sector of the economy, the health care delivery system has undergone dramatic restructuring, especially in the domain of financing and payment. The most wide ranging of these reforms has occurred in the Medicare program, which provided health benefits for over 31 million beneficiaries in 1985, at an expense of approximately $67 billion.

Medicare program expenditures increased dramatically throughout the 1970s, at a rate of 11% per year. Mounting evidence that cost-based reimbursement, mandated by the Medicare program since its inception in 1965, provided perverse incentives for utilization and cost control, and growing dissatisfaction with the results of regulatory controls established the foundations for new approaches to government financing of health services. Hospitals, which accounted for the largest and fastest rising category of expenditure for Medicare, became an obvious target for program cost-savings and reform.

The Reagan administration's efforts to promote competition over regulatory mechanisms to control health care expenditures included replacing Medicare's cost-based reimbursement for hospitals--first through payment limits established by the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982, which applied a cost-based cap to hospital payments, and then through the Prospective Payment System (PPS), which established per case payment based on diagnosis-related groups (DRGs) the following year. The PPS marked the end of cost-based Medicare reimbursement for all but a few of the nation's hospitals.

The PPS was touted as a "procompetitive, budget-reducing reform"[1] that would improve the efficiency of hospitals. The per-case payment was intended to encourage efficiency of patient treatment, curtailing unnecessary hospital stays and ancillary use, and to reduce the costs of patient care by allowing hospitals to retain the difference between costs and payment rates. The marked reductions in occupancy since PPS was introduced have sparked very vigorous competitive behaviors in hospitals to protect, if not increase, their share of business in local service markets.

Other prospective payment approaches, developed with objectives compatible with the competitive thrust of federal health policy reform, were already underway when the PPS was introduced in 1983. Alternative health plans (AHPs), including health maintenance organizations (HMOs), competitive medical plans (CMPs), and other fixed capitation arrangements are among the best known of these alternatives, and experienced a resurgence of interest among federal policymakers. These plans were based on incentives for efficiency similar to the new PPS for hospitals, but applied these incentives across a broad spectrum of patient care services. Developed to compete as an alternative to fee-for-service options, the plans provide a comprehensive range of services for a fixed monthly fee that typically covers the cost of hospitalization, physician visits, specialty and emergency care with additional benefits such as pharmacy, dental and preventive care, offered by some plans. Out-of-pocket costs to members are limited, usually to the amount of copayments if required by the plan. The popularity of HMOs and other AHPs was generally attributed to plan incentives to control health care utilization and expenditures for enrollees by achieving greater efficiencies in the use of hospital services; to substitute outpatient and ambulatory care for inpatient services where appropriate through patient care management; and to encourage the use of less

[1]Harvey M. Sapolsky, "Prospective Payment in Perspective," Journal of Health Policy, Politics and Law, Vol. 11, No. 4, 1986, pp. 633-645.

resource-intensive auxiliary services, such as home care, and diagnostic and testing services.

It is through these means that HMOs had traditionally achieved comparative advantage over the fee-for-service sector. As payers, HMOs depended on negotiating favorable prices with hospitals, focusing on non-hospital ambulatory services, and on using utilization controls or case management to compete favorably with fee-for-service health plans. As providers of service, directly through the HMO or under contractual arrangement, they achieved efficiency through the very same incentives as those introduced by the PPS. Cost-based reimbursement for hospitals had usually enabled HMOs to achieve comparative advantage through their utilization and pricing structure over benefits and premiums available in the fee-for-service sector. This was possible primarily through the establishment of risk arrangements that focused on total patient care costs, of which hospital costs were substantial. The PPS, however, was intended to place growing pressure on hospitals, forcing them to compete more vigorously as providers with HMOs, by reducing their costs and by carefully managing patient utilization.

The important question of whether the PPS may affect AHP comparative advantage over fee-for-service health care is of particular concern to proponents of HMO development and expansion. This could happen by improving the ability of HMOs to negotiate rates as a competitive response by financially threatened hospitals faced with declining occupancy and patient service revenues, or by reducing the advantage of HMOs as pressures on hospitals and the fee-for-service system increase to control utilization. The basis of this concern rests with the possibility that hospitals, to accommodate PPS incentives applicable to approximately 40% of industry beds, may alter patient treatment patterns in the fee-for-service sector which have provided HMOs generous potential for cost savings.

The significance of PPS-related competitive pressures for payers and providers is an important consideration in assessing the short term and long range viability of AHPs, and their availability to potential Medicare and group enrollees. Renewed government interest in HMO enrollment has generated particular interest in this issue. To the extent that the PPS affects the cost and mix of medical care received by fee-for-service beneficiaries in a region it will affect the comparative advantage of HMOs relative to traditional benefit plans, the potential for HMO growth and development, the willingness of plans to compete for Medicare beneficiaries, and the financial incentives of beneficiaries to enroll in HMOs.

This report examines the following questions:

- Has the PPS altered the means through which HMOs achieve comparative advantage in health insurance markets, resulting in organizational changes in the industry itself?
- Has the PPS affected the markets in which HMOs operate, and the competitive position of HMOs within those markets?
- Have HMOs altered their behavior in response to these PPS-related changes, both with respect to handling of patients and competitive strategies?
- What is the relationship between the PPS, competition, and comparative advantage for HMOs, and how has this affected Medicare and non-Medicare beneficiary access to HMO alternatives to fee-for-service health care?

2.0 Method

This report identifies trends in the HMO industry from 1980 to 1985, before and after introduction of the PPS, and presents preliminary analyses at the plan and market area levels to examine PPS effects on (1) industry-wide changes; (2) HMO markets; (3) HMO comparative advantage relative to fee-for-service health care; and (4) PPS effects on Medicare and non-Medicare enrollment in HMOs. Analyses of secondary data sources have been used to explore trends in HMO industry structure, enrollment, and performance. Case studies conducted during the fall of 1986 in 10 market areas, 7 of which include HMO plans, have been used selectively to help illustrate trends.

2.1 Secondary Data Sources

Secondary data sources were used to conduct exploratory descriptive analysis of national data at the plan level and market area level. Plan level analyses are based on Interstudy's National HMO Census for the years 1980 through 1985. These data provide information such as model type, plan age, federal qualification status, and membership of group and Medicare enrollees for HMOs operational in the United States. Plan level data were also included from the Office of Health Maintenance Organizations (OHMO) Annual Report for the years 1980 through 1984, the most current available year. These reports, for federally qualified plans, contain additional information such as expense and revenue per member month, hospital days per 1,000 members, and average ambulatory encounters per member per year. These data items have been used for selected analyses; however, data are available for only about half the plans, due to missing data in these reports, and their application should be considered cautiously. Plans with TEFRA risk contracts were identified through reports obtained from HCFA's Office of Prepaid Health Care.

Market data were obtained from several sources at the county level. Data include information on hospital and physician supply, HMO membership, per capita income, employer size, population characteristics, and AAPCC rates obtained from HCFA. Provider data, such as hospital occupancy and utilization rates, were obtained

from provider files, constructed for provider and beneficiary impact analyses in related evaluation areas.

Several measures were constructed for special analyses at the county or market level and were used for analysis of secondary data. These include:

- Herfindahl Index: a county measure of hospital industry concentration with a value between zero and one, to indicate the degree of hospital competition in a local market.[1]

- "Gain": a measure of the average expected gains and losses in revenue experienced by hospitals under the fully phased-in PPS. This measure was included as an estimate of expected PPS impact on hospital markets at aggregate county levels.

- "Gain" variability: a measure of the variation in "gain" across hospitals at the county level. This measure was included as an estimate of expected PPS impact within country-level hospital markets, indicating the variation in impact across hospitals.

- HMO penetration: a measure of HMO enrollment in relation to area population. This measure was constructed by allocating HMO membership as reported by the National HMO Census across HMO market areas identified in the 1986 HMO directory compiled by the American Medical Care and Review Association. When market information was not available, HMO plan membership was allocated across counties within Standard Metropolitan Areas.

In all cases, data were aggregated (e.g., from the hospital level to the county level) or disaggregated (e.g., from the MSA to the county level) to provide county level estimates for analytic use.

2.2 Case Studies

Case studies were conducted to obtain information from HMO executive and financial officers, marketing directors, and medical directors across the nation. Information was also obtained from executive and financial administrators and staff at hospitals, in aftercare settings, at Peer Review Organizations and fiscal intermediaries, and from independent area physicians, and provides contextual background for HMO

[1]The index is the sum of the squares of market shares of total hospital beds: a value of 1.0 indicates a monopoly; values approaching zero indicate many small hospitals.

interview data, used as the primary case study data for this study. Site visits were conducted from September through December 1986 in the following local health care market areas: Burlington, Vermont; Portland, Oregon; Butte, Montana; Fresno, California; Pittsburgh, Pennsylvania; Waterloo, Iowa; Tampa, Florida; Albuquerque, New Mexico; Ashville, North Carolina; and Mobile, Alabama. These market areas reflect a broad cross section of health care provider supply characteristics, geographic diversity, HMO market share, and demographic characteristics useful for comparison of HMO activity in markets experiencing different conditions of competition.

Medium-sized and small urban markets and rural markets are represented. Three markets--Ashville, Burlington and Butte--have no HMO activity, but provide important comparisons with markets new to HMO development such as Tampa and Mobile, and with established HMO market areas such as Portland.[1]

2.3 Statistical Analyses

Data items were selected for analysis at the plan and market levels based on reviews of existing literature, and through interviews and observation of market dynamics during the case studies. In some cases, analyses were limited due to unavailability of data or poor data quality. Primary outcomes used for the analysis include:

- changes in HMO market share;
- changes in per beneficiary utilization and profit margins for HMOs;
- changes in Medicare utilization and profit margins (relative to the AAPCC);
- numbers of Medicare HMO/CMP contracts;
- changes in the AAPCC itself;
- changes in beneficiary enrollment in AHPs.

Descriptive trend analysis based on frequency distributions and univariate rela-

[1]Site reports are available from HCFA.

tionships provide the basis for reported findings. Multivariate techniques, including ordinary least squares regression and discriminant analysis, were also used selectively. Again, results should be interpreted with caution, and as preliminary only, as they are often based on crude measures, or incomplete reporting.

3.0. Literature Review

3.1 AHPs and the PPS

Information about the effects of Medicare's Prospective Payment System on the conduct and performance of alternative health plans is generally anecdotal in nature, or limited to hypothetical discussion about expected effects of the fully implemented PPS. No empirical studies have yet been conducted on this topic; most researchers have not yet linked, conceptually, PPS and AHPs. Ginsberg (1986) speculates about several axes of potential PPS impact on AHPs, including resource intensity per hospitalized case, hospital price per unit of resource, and quality/amenity of care, but his comments are limited to editorial remark. The Health Care Financing Administration also suggests the possibility for PPS impacts on AHPs, speculating about plan contracts with the Medicare program. The 1985 annual report states that because "HCFA bases its payments for Medicare beneficiaries enrolled in HMOs and CMPs on the adjusted area per capita cost (AAPCC) of non-HMO member and non-CMP member beneficiaries...any success of the PPS in reducing fee-for-service cost growth will indirectly affect HMOs and CMPs, by reducing the growth rate of their payment for Medicare beneficiaries," and concludes that AHPs will face an increasingly difficult challenge in economically controlling Medicare beneficiaries.

The importance of the PPS in generating spillover effects for other payers, influencing their administration and structure, and the role of Medicare reimbursement policy on third party payers, is described in recent research by Korda (1985, 1986) and Bell (1985), with particular reference to state Medicaid programs. Singer has used a similar model, focusing on state Medicaid programs, and work in progress at Blue Cross Association of America promises to examine PPS effects on the Blues nationwide. All of these studies are of a formative, policy-analytic genre, but provide strong indications that Medicare's hospital payment methods can be expected to also influence AHP industry structure.

3.2 AHPs and Health Care Markets

Most researchers have examined AHPs not as they respond to hospital market dynamics, as suggested in this study, but as catalytic agents themselves of competition in hospital and other provider markets. These studies have examined AHPs in the context of cost-based reimbursement, prior to the PPS with its incentives, and assess AHP comparative advantage relative to structurally inefficient, non-competitive incentives in the fee-for-service sector. Enthoven, McClure and Ellwood (1981), addressing both generic AHP incentives and the influence of AHPs on market competition, hypothesize that as HMOs gain large market shares through fixed budget financing--the plans will succeed in reducing inpatient utilization in local health care markets by keeping patients out of hospitals and using fewer resources once a patient is admitted, and by controlling significant amounts of patient volume so they become strong price negotiators with hospitals. If the growth and development of AHPs does result in cost containing behavior in local health care markets by conventional insurers and providers then, as Luft (1983) suggests, AHPs would be a valuable policy option not only because of savings accruing to their own enrollees, who are a small share of the market, but also because spillover effects of HMOs lead to lower health system costs for everyone.

Research on this topic, while sparse, has been difficult to interpret. Luft (1983) reports that, in none of three areas (Hawaii, Minneapolis-St. Paul, and Rochester) was there clear evidence of cost containing competitive outcomes. Cross-sectional analysis of SMSA data showed a negative, but insignificant, correlation between HMO market share and hospital use by everyone in the area--a result consistent with Goldberg and Greenberg's (1980) findings; however, a weak positive relation with hospital use by non-HMO members was also found. Luft and colleagues suggest that this could be due to a self-selection effect, a cost increasing competitive effect (as hospitals shift costs to other payers), or a combination of these with a very weak overall cost containing

effect. Johnson and Aquilina (1986), in their study of the Minneapolis area through 1982, also failed to find evidence of community-wide cost savings.

All of these studies qualify their remarks, noting that relatively low AHP market share may reduce AHP market area effects (a maximum market penetration rate of 35% was found in Minneapolis, reflecting a considerably lower share of hospital market services). Only one study poses the question of effect under Medicare's PPS for the fee-for-service sector, and all studies are limited to data from pre-PPS time periods. There are no studies among these, or others, that examine the effects of hospital markets on AHPs, or the question of whether competition in hospital markets may be linked to Medicare's hospital payment approach or to effects on AHPs and their markets.

3.3 AHP Comparative Advantage

Numerous studies have been conducted to evaluate the characteristics of alternative health plans which make them potentially cost-effective alternatives to traditional modes of care. Most research has been based on a small and select group of HMOs that have been the subject of repeated studies, and which have produced some generally accepted conclusions about their performance. Key findings are reviewed below, with a particular focus on issues of cost and utilization, enrollment, and AHP competitive behavior in health care markets.

As early as the 1970's, research on AHP cost and utilization has shown that fixed capitation plans are able to achieve cost efficiencies relative to fee-for-service and indemnity plans. Luft (1981) determined that annual costs for Blue Cross/Blue Shield subscribers range from 16% to 18% higher than for enrollees in the lowest cost prepaid health plans. Similar findings have been confirmed by other researchers. Cost savings in prepaid plans have been generally attributed to reductions in hospitalization for plan members, frequently 40% lower than traditional plans (Luft, 1981). The available evidence regarding treatment of patients once hospitalized in AHPs or fee-for-service

appears to be mixed, with some researchers suggesting comparable service intensity, given casemix equivalency, while others have found reductions in intensity and cost per hospitalization (Luft, 1981; Birnbaum, 1984).

Studies of ambulatory care utilization and cost in AHPs and in the fee-for-service sector suggest that AHP members use more physician and non-hospital services than non-members, although some HMO administrators claim that the use of preventive services may substitute for the costs of utilization of inpatient services (Trieger, 1981). More recent anecdotal evidence suggests that, as the AHP environment becomes increasingly competitive, utilization review controls and increasing cost consciousness due to market pressures has resulted in increased substitution of ambulatory services to maintain AHP cost advantages for total patient care.

3.4 Enrollment

Enrollment choice, while it is not the direct subject of the proposed research, does serve to illustrate characteristic demand factors that provide an important aspect of AHP comparative advantage relative to the fee-for-service sector. Luft (1981) and others point out that most AHP members have had experience with fee-for-service health care, and may maintain this comparison as a standard in the decision to enroll, disenroll, or continue plan membership.

Demographic comparisons between HMO enrollees and persons who use fee-for-service health care have yielded conflicting results. Kidneigh (1981) and Berki and Ashcraft (1980) have identified typical enrollees as young and unmarried, while Hetherington et al. (1975) found enrollees to be married with young children. Some studies have identified enrollees as having low per capita income (Kidneigh, 1981; Berki and Ashcraft, 1980), while others claim enrollees are more highly educated and do not have lower incomes (Tessler and Mechanic, 1975). Most studies agree that HMO

enrollees tend to be highly mobile, relatively young and unattached to community, family or medical roots, and in the case of staff model enrollees, often do not have an established relationship with a personal physician. More recent studies suggest that this source of selection bias may be temporary, however, with some "regression to the mean" as a plan ages.

The most frequently cited reasons for enrollment among employee-group plan members are first financial, including low total health care costs, low-cost prescriptions, less worry about unexpected medical bills, and full-time service centers; and then relate to convenience of service, accessibility, comprehensive coverage and quality of reputation (Kidneigh, 1981). Assurance of no out-of-pocket costs was noted as the most important reason for enrollment by Wollstadt et al. (1978) in a summary of enrollment research.

There is far less information available about the enrollment choices of Medicare beneficiaries, in part because fixed capitation options, with the exception of demonstration project enrollments, have become available only recently. It has been suggested that the elderly, like chronic care patients, are more likely to have existing provider relationships, and will be less willing to change providers, as is required by many AHP models. Informal evidence from some plans which have studied this topic does not support these claims.[1] However, it seems likely that similar criteria--financial liability and convenience--are also significant factors to the enrollment decisions of elders, in comparing AHPs with fee-for-service health care.

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[1]One plan reported that 3 of every 5 of their Medicare members willingly switched providers as a condition of HMO membership.

4.0 Conceptual Model

A model to examine PPS impacts on HMOs and their markets is based on an understanding of whether and how the change from cost-based reimbursement incentives for hospitals to the PPS has affected comparative advantage in the HMO industry. The comparative advantage of HMOs refers to the ways in which plans maximize efficiency or profitability relative to other fee-for-service offerings in markets for health insurance products. Because premiums are determined largely at the local market level, HMOs are required to compete through plan incentives that provide comprehensive health services at a prospective, fixed rate per enrollee. These incentives encourage:

1) Hospital efficiency. Because capitated health plans provide a comprehensive range of services, AHPs are specifically concerned with the costs of patients' hospitalization, as the single most expensive component of the health care benefit package. AHPs are, therefore, expected to selectively shop for hospital services in a health care market area according to the costs and services required for their patients. AHPs are also expected to channel patients to more cost-effective hospitals, as appropriate to their care needs.

2) Substitution of less costly services for hospital care. Because AHPs are responsible for the coordination of a patient's total care needs for a fixed capitation payment, strong incentives exist to provide care in the least costly manner, to minimize the cost of the patient's entire treatment. AHPs are expected to make greater use of outpatient, physician and other provider services, reducing rates of hospitalization where possible; to encourage shorter lengths of stay; and to provide fewer ancillary services within the case.

3) Greater use of non-specialist primary care physicians and non-physician auxiliary services through utilization control. While fixed capitation payment programs may encourage the use of physician services as a substitute for more costly hospital care and often use the physician as gatekeeper to a patient's care, AHPs can also be expected to direct patients to primary care providers and less resource-intensive auxiliary services, such as home care, to control the utilization and costs of specialty care. Similarly, AHPs are expected to prudently monitor use of diagnostic and testing services through channeling and utilization control.

4) Adoption of cost-saving technology, services and innovations. Fixed capitation payment includes incentives that encourage AHPs to make available new techniques, services and innovations, especially where cost savings or marketing advantage can be

achieved. AHPs are likely to select innovations as substitute services, preventive care or to enhance existing benefit structures within premium parameters.

Through these incentives, plans can seek comparative advantage relative to fee-for-service premiums in two ways: (1) through better utilization control and patient care management, and (2) through competitive pricing and monopsony advantage in the marketplace.

Comparative advantage through utilization control and patient care management depends on internal plan controls and administrative practices. HMOs with the ability to centralize utilization review and monitoring of patient referral, physician practice patterns, and hospitalization, especially staff and group plans, have typically been most successful in achieving comparative advantage by adopting protocols, standards or norms for utilization review. The literature strongly supports the success of managed care plans in reducing utilization levels below that experienced in local fee-for-service markets.

Comparative advantage is also achieved through competitive price and monopsony market power by pricing and negotiating competitive arrangements for services with hospitals, physicians and other providers. HMOs may select both location and provider, levels and types of benefits, and risk arrangements that often include explicit incentives for utilization of hospital and other provider services. Plan size, market penetration and affiliation with other providers or payers permit monopsony advantage where plans may influence their costs in their role as a dominant purchaser of health care services. HMOs with high market share, or affiliated with larger provider networks or chains, have been best able to maximize their comparative advantage in external markets.

Plan characteristics will likely affect the performance and ability of HMOs to achieve comparative advantage. Such characteristics include model type, size, federal qualification status, and governance, each of which have been found to influence plan

performance in the marketplace. Characteristics of supply and demand in local market areas, including the availability of health care providers, utilization patterns and costs of hospital and non-hospital services, hospital market competition, and demographic characteristics such as per capita incomes, population density and the availability of large employer groups which serve as potential consumer markets, are also likely to affect HMO comparative advantage through "location" bias to areas where HMOs can reduce costs relative to the fee-for-service competition.

4.1 Expected PPS Effects on HMO Comparative Advantage

Hospital reimbursement incentives shifted dramatically with Medicare's change from cost-based methods to prospective, per case payment under PPS. Under cost-based reimbursement, payment was provided on a fee-for-service basis, with few incentives to efficiently manage patient care with respect to services provided because the costs incurred in treatment were reimbursed. Other third party payers have historically paid for hospital and related care based on charges, or a percentage of charges, which are typically in excess of a provider's incurred costs. Perverse incentives embedded in these payment approaches have been particularly strong for ancillary services, which have been subject to few regulatory restrictions. Medicare, like most insurance programs, provided little incentive for providers to use lower cost sites of care because the federal government retains the insurance function--thereby reducing active cost and utilization monitoring that has more often marked the behavior of AHPs and other fixed capitation arrangements.

Changes in hospital reimbursement with the PPS have introduced strong incentives for hospital efficiency. Coupled with nationwide redistribution of Medicare reimbursement across and within hospital markets under the PPS, it is expected that the PPS will alter AHP comparative advantage relative to the fee-for-service sector, and that the influence of the PPS will vary according to local market conditions.

These changes are expected primarily as a result of PPS effects on hospitals.

The PPS includes incentives for hospitals that are similar to the incentives of AHP fixed capitation models; PPS incentives for hospitals encourage shortened lengths of stay, reductions in the use of ancillary and resource-intensive services, and more stringent forms of utilization review in response to PRO requirements designed to reduce unnecessary admissions to hospitals. The PPS provides indirect incentives similar to those of AHP models to provide care in less intensive settings, through earlier discharge and aftercare services, increased use of non-hospital physician services, preadmission testing, and "unbundling" of services within the case. The PPS also provides incentives that are expected to influence the nature of the hospital output, or product, with respect to technology adoption and service innovation, especially when cost-savings or market advantage can be gained. Thus, PPS is expected to result in less use of hospital care, and a less costly bundle of services per episode of illness. This will reduce the fee-for-service (claim outlay) experience in local areas, reducing the cost advantage enjoyed by HMOs. Also, these PPS-induced efficiencies should reduce the Medicare AAPCC; this should affect HMO enrollment or HMO behavior or both, will tend to reduce (or increase) the price paid by Medicare to HMOs, and should discourage (or encourage) HMO enrollment of Medicare beneficiaries.

These "direct" effects of PPS on AHPs can be expected to trigger a process of changes in the HMO industry structure (i.e., plan organization) and the market strategy with which AHPs compete and achieve comparative advantage over the fee-for-service sector. Specifically, we hypothesize that HMOs may be less able to rely on utilization control strategies for achieving comparative advantage, and more aggressive in achieving comparative advantage by means of monopsony leverage in the marketplace. These effects can be assessed by examining PPS effects on HMO industry structure, on hospital markets (and in turn on markets for the services of other providers) and through related effects on health insurance, or payer markets, which reflect the dynamics of supply and demand in markets for health services. Anecdotal information already suggests that

Medicare's adoption of the Prospective Payment System for hospitals has altered the comparative advantage of managed health systems in some market areas, influencing the viability and competitive potential of fixed capitation plans, and their willingness to enter particular market areas and to enroll Medicare or other beneficiary groups due to reduced profitability under the PPS.

4.2 HMO and Market Area Characteristics

Plan and market area characteristics, considered to be sensitive to changes in industry organization, plan availability, plan behavior, and beneficiary enrollment, were used for exploratory analyses. Variable names are indicated in parentheses, as they appear on tables throughout this report.

Plan Characteristics

Model type: Staff, group, network and IPA model types describe plans that differ organizationally and administratively, and feature a variety of incentives used for achieving comparative advantage in the market. (STAFF, GROUP, NETWORK, IPA)

Plan size and age: Plan stability, profitability and growth are often related to size (enrollment) and age. These factors are likely to influence plan performance. (SIZE, AGE, ENROLLMENT)

Federal qualification status: Federally qualified plans have met minimum plan and benefit requirements and may offer a different "product" than non-qualified plans, which are increasing their numbers in the marketplace. (FQ)

For-profit status: For-profit plans have lacked access to federal funding sources, but generally have greater access to capital for expansion and growth. For-profit plans, which also tend toward greater benefit flexibility, were identified for 1985 only. (FORPROF)

Profit margin: This measure was constructed by computing the ratio of "revenue per member month/expense per member month" for OHMO reporting plans that are federally qualified, 1980-84). (PROFIT)

Medicare enrollment by contract status: Plans were characterized by whether Medicare members were served under risk contracts, as cost members or as Medicare supplement members, or not at all. (AT-RISK, MEDICARE, NO-MCARE)

Market Characteristics

Birth rate: Births per 100,000 population were included as a measure of county demographic structure. Birth rate is used as a measure of demand and need for health coverage at the local level. (BIRTH)

Population density: Population density per square mile was included because HMOs are likely to operate most efficiently in densely populated areas where the membership base is concentrated. More densely populated areas are likely to attract HMO market entry and growth. (POPDENS)

Percent of population over age 65: A high percentage of elderly in a market area may indicate the demographic structure of the community and available work force. A high percentage of seniors may discourage HMO market entry in less populated areas, as plans seek employer group enrollment. In densely populated areas served by HMOs, plans may target Medicare marketing to areas with higher percentages of elders. (P65GT)

Urban/rural location: Location is expected to play a key role in HMO market entry decisions. Urban areas typically offer an environment more favorable to HMO development, providing a larger enrollment base, higher utilization and cost, and the availability of other health care providers. (SMSA)

Per capita income: Per capita income reflects ability for self pay, higher levels of health status, insurance coverage, and prior levels of utilization that are more typical of more affluent areas, where per capita incomes are greater. (CAPINC)

Percent change in Consumer Price Index: Year-to-year changes in the CPI show changes in the price of health care resources and inputs. Changes in the CPI at the regional level were used to indicate economic growth and development. HMOs, especially regional or national affiliates, are likely to avoid areas with little change in the CPI, and to seek areas experiencing increases, to maximize plan comparative advantage through competitive pricing strategies. (CPIPCT)

Large employer groups (>1000): The presence of large employers in a market often serves as an attraction to HMO marketing. Many plans target their marketing to particularly large groups, for example Fortune 500 companies, that may sponsor or support HMOs in the interest of containing health benefit costs. For Medicare populations, the presence of large employers may indicate developed health benefit options for workers under trade or union pacts. (EMPLARG)

Herfindahl Index: HMOs may encourage or respond to competition in local hospital markets. HMO penetration is likely to be greater in competitive hospital markets. (HERFINDX)

The effects of competition on AHPs are also likely to be related to previous levels of health care utilization, and expenditure, and the availability of other providers in an area.

Nursing home beds: The supply of nursing home beds per capita is used as an indicator of available supply that is likely to facilitate or hinder hospital responses to the PPS, such as early discharge in relation to the availability of community care alternatives. (NHB)

Physician to population ratio: Physician supply per 100,000 population was used as a measure of both supply and demand. Areas of physician over-supply generally experience greater cost and utilization of health services, creating greater demands on the health care system than medically underserved areas, where physician manpower may be strained. (PHYSPOP)

HMO penetration: The percent of the county population served by an HMO is used as a measure of market share, for changes that may be related to the PPS. HMO penetration base-year levels were used in some analyses, to distinguish older, established areas with developed HMO markets from areas that have experienced more recent growth. Current and prior levels of HMO penetration are likely to be related to rates of growth and industry performance at the local market level. It is expected that areas with higher HMO market share will grow more slowly under the PPS and will differ from areas with little or no access to plan membership. (HMOPOP)

AAPCC Rate: The average adjusted per capita cost (AAPCC) for Medicare Parts A and B, averaged over a five-year period, is used as the basis for Medicare HMO payments. HMOs are expected to be more willing to participate with TEFRA risk contracts in areas with higher AAPCC rates. The AAPCC rate is also used as a proxy for per capita health care expenditures for Medicare (and community group) members at the county level. HMOs are expected to locate in these areas, where comparative advantage can be achieved relative to the fee-for-service sector. (AARATEAB)

Countywide Gains/Losses Expected Under Fully Implemented PPS: The PPS is expected to alter AHP markets in relation to the level of effect experienced for hospitals in the aggregate at the county level. Areas where the PPS is expected to result in overall gains are expected to experience fewer pressures attributable to the PPS, with fewer impacts on HMO markets. Areas that experience aggregate losses under the PPS are expected to experience increased pressure with greater impact on AHP markets. (GAINLR_C)

Variability in Countywide PPS Across Hospitals: Another way that the PPS may alter local health care market conditions is by altering the relative competitive position of hospitals in an area, affecting differential gains and losses across facilities. Counties experiencing greater variability in PPS impact in hospital markets are likely to have a greater impact on AHP performance and behavior, due to greater competitive pressures for hospital viability in these areas. (GAINLR_V)

Short-term General Hospital Utilization: Since achieving efficiencies in hospitalization over the fee-for-service sector is a primary means by which HMOs may obtain comparative advantage over the fee-for-service sector, HMOs are expected to locate in areas where short-term general hospitalization rates are higher. Prior rates of hospital utilization are expected to be related to growth of HMO membership in established markets. (STGHU_AV)

These key plan and market indicators will be used to examine the expected impacts of the PPS in each of the four areas of analysis in this report--the HMO industry, availability of plans in local markets, plan behavior, and beneficiary enrollment--in the following chapters. PPS effects will be examined by observing trends or changes over time in county-level indicators as they relate to gain or loss expected by hospitals under the PPS. These indicators are particularly sensitive to changes in access to health care, and the appropriateness of medical service relative to community need.

5.0 Overview of the HMO Industry, 1980-1985

Competition in health care has increased dramatically during the past 5 years, effecting wide-ranging transformations in the financing and delivery of health care. Increasing cost consciousness in the public and private sectors, combined with hospital payment reforms and shifts from regulatory to competitive approaches in the 1980s have been primary factors influencing these reforms.

Considerable growth has occurred in the HMO industry during this period. HMO market share increased substantially during the 1980s, with most gains attributed to shifts away from traditional indemnity plans. In 1980, 95% of health care delivery was provided through the fee-for-service system.[1] By 1985, 87% of Americans received fee-for-service care (15% received "managed" care through the fee-for-service system), 9% received care from HMOs and CMPs, and 4% from PPOs.[2] Another recent study reports that 75% of the U.S. population was covered by traditional health insurance in 1984, but only 66% were covered by such plans in 1985. HMO enrollment during these same years increased from 8% to 9% of the population.[3] By the end of 1983, 290 HMOs were serving 13.6 million members.[4] In June 1985, enrollment had reached 19 million people,[5] and by November 1985, 431 HMO plans were operating in all but 6 states and in the District of Columbia.[6]

While the rapid surge in HMO growth cannot be attributed to the PPS, there are clear indications that the industry is changing in response to the newly competitive environment in health care, and that many of these changes are occurring concurrently with the introduction of the new Medicare payment system. The nature of comparative advantage for HMOs over the fee-for-service sector also appears to be changing, with

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[1] Patricelli, 1986 (Health Affairs Summer 1986)
[2] Medical World News, Feb. 10, 1986
[3] Modern Healthcare, Sept. 12, 1986
[4] Hospitals, Sept. 16, 1984
[5] InterStudy, National HMO Census 1985
[6] Hospitals, Dec. 16, 1985

new plan types and hybrid forms of organization achieving a dominant position in the industry. These competitive pressures have also marked major shifts in the positioning of HMOs and their competitors in the health insurance market. Where HMOs typically face Blue Cross/Blue Shield and indemnity plans as their primary competition, the range of new entrants has expanded to other HMOs, including national chains and plans sponsored as joint ventures with insurers or hospital chains, and Preferred Provider Organizations (PPOs) which provide coverage for services through contractual arrangements with providers who agree to provide care to the plan at discounted rates.

The flexibility of HMO model types is especially suited to diversification of plan organizational structures to meet the ever-widening competition in the health insurance market. Interstudy's National HMO Census defines four HMO model types currently operational in the U.S. These include:

Staff: An HMO that delivers health services through a physician that is controlled by the HMO unit.

Group: An HMO that contracts with one independent group practice to provide health services.

Network: An HMO that contracts with two or more independent group practices, possibly including a staff group, to provide health services. While a network may contain a few solo practices, it is predominantly organized around groups.

IPA: A plan with one or more of the following characteristics:

- HMO contracts directly with physicians in independent practice;
- HMO contracts with one or more associations of physicians in independent practice;
- HMO contracts with one or more multispecialty group practices (but the plan is predominantly organized around solo/single specialty practices).

While these prototypes do not begin to accurately describe the diversity within and across plans, there is considerable evidence that different plan types vary greatly in performance and efficiencies resulting from differences in plan incentives, different cost structures, and different styles of medical practice and administrative control.

This section describes trends in the HMO industry throughout the 1980s. Trends in industry growth, enrollment, organization, merger and closure activity, and profitability are presented along key plan characteristics--model type, size, and location--that determine industry structure and performance. Descriptive findings based on the National HMO Census and OHMO Annual Report data, are provided below. HMO data from both sources were annualized to standardize differences in reporting periods to December of each year over the 1980-85 time series. Numbers of plans and rates may therefore differ slightly from those reported by Interstudy and OHMO publications, which have not been standardized across time.

5.1 Numbers and Types of Plans

Numbers of HMOs, plan membership and market share have increased significantly during the 1980-85 period, and especially so since 1983 (Table 5.1.1). The number of HMOs has slightly more than doubled, showing a 103% increase during the 1980-85 period, from 233 plans in 1980 to 472 plans in 1985. Networks and IPAs have far outpaced both group and staff model HMOs with sharp increases reported after 1983 (Figure 5.1.2).

By 1985, more than half of all plans were IPA models (42% were IPAs in 1980). IPAs were three times more prevalent than the second largest plan type, networks, which surpassed both group and staff model plans in number for the first time in 1985.

The entry of new plans rose sharply after 1983. New plan start-ups fluctuated, from 20 to 47 per year during the years 1980 to 1983, but increased to 66 and 149 plans in 1984 and 1985, respectively. (Data table not shown.) The number of new plans increased as a percentage of all plans, from 9% in 1983 to 32% in 1985.

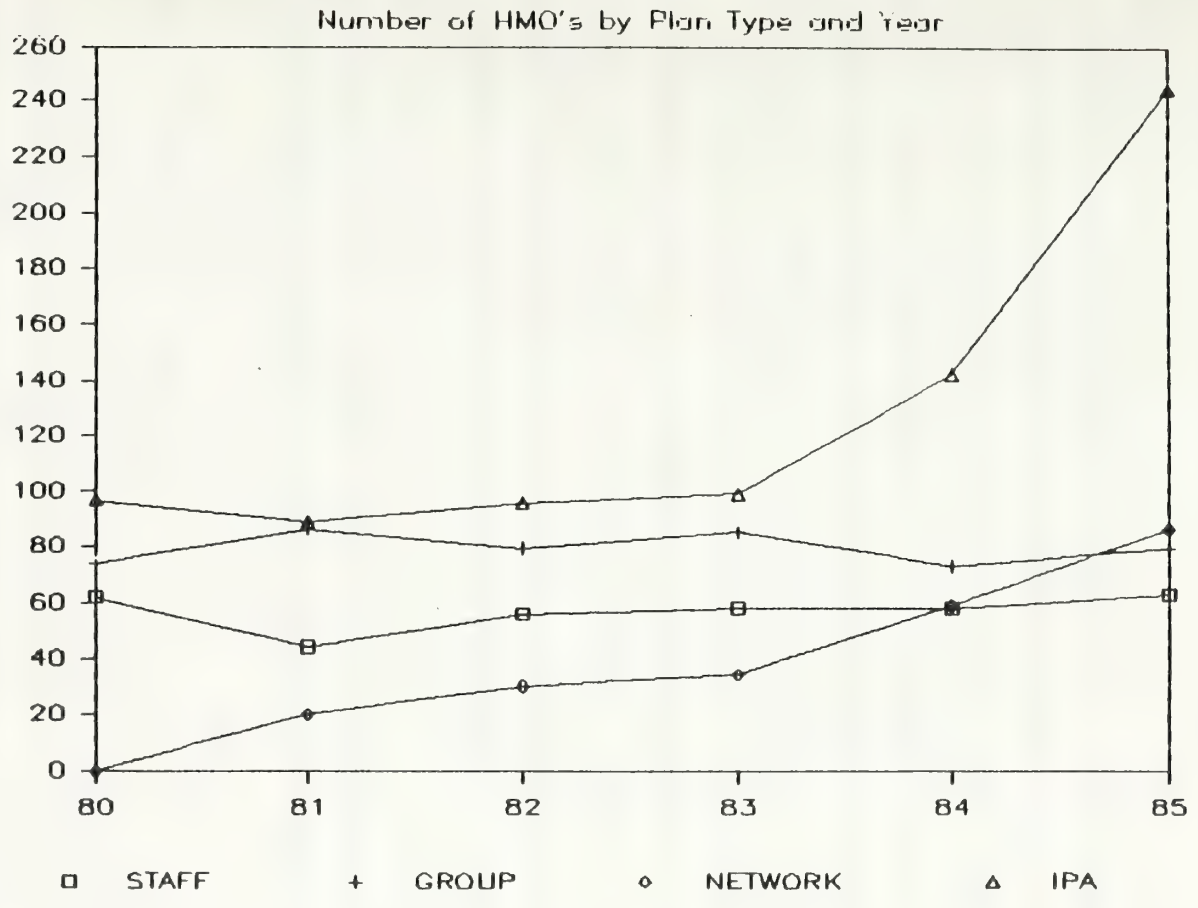
Rapid industry-wide changes are clearly evident in these trends. Once dominated by staff and group models, which rely heavily on a lock-in, "managed care" approach with the HMO itself assuming considerable risk for patient care costs and utilization, the industry is moving to less restrictive and more flexible IPA and network

TABLE 5.1.1: NUMBER OF HMOs BY PLAN TYPE BY YEAR

	PLAN TYPE								
	STAFF		GROUP		NETWORK		IPA		ALL PLANS
YEAR	Number of Plans	% Total	Number of Plans	% Total	Number of Plans	% Total	Number of Plans	% Total	Number of Plans
1980	62	27	74	32	0	0	97	42	233
1981	44	18	86	36	20	8	89	37	239
1982	56	21	79	30	30	11	96	37	261
1983	58	21	85	31	34	12	99	36	276
1984	58	17	73	22	59	18	142	43	332
1985	63	13	79	17	86	18	244	52	472
% Change 1980-85	+1.6%		+6.8%		+330% (from 1981)		+152%		+103%

Data Source: Interstudy National HMO Census

FIGURE 5.1.2:



Data Source: Interstudy National HMO Census

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models, which tend to diffuse risk more immediately to hospitals and smaller physician groups or independent physicians. Both IPAs and networks depend on fee-for-service providers with whom discounts or capitation agreements are negotiated. The financial incentives for utilization control employed in the risk arrangements for these plans tend to be more decentralized than with staff and group models, holding providers of service at greater risk.

As industry segments, IPAs and networks are on the whole newer, less experienced plans, with a wide range of risk and utilization control mechanisms. During case study site visits some IPAs, which typically maintain the least stringent utilization control of all HMO model types, reported extremely flexible standards for review of physician practice and referral patterns. Other IPA contracts with physicians held providers at full or partial risk for patient care costs under capitation as an incentive for controlling utilization. Network utilization control and risk arrangements ranged from full physician capitation, including the costs of hospitalization, to tightly monitored review of outpatient utilization (implemented explicitly to achieve comparative advantage over other plans) and concurrent review of hospital stays. Most plans also permitted physicians to enroll patients from their private practices, as a primary method of marketing plan membership.

Group and staff models, by contrast, were more likely to implement more standardized protocols for medical practice and treatment, with routinized monitoring and follow-up review.[1]

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[1]Obviously, quality assurance activities will need to consider these major industry changes. While all plan types should be monitored for appropriate patient care management, and for the potential for underutilization of services, these efforts should focus on the potential created by the specific configuration of risk arrangements, benefit coverage and patient management methods employed by each model type and plan.

5.2 Enrollment

HMO enrollment from 1980 to 1985 increased 115%, from 8.9 million members to 19.2 million members (Table 5.2.1), or approximately 9% of the U.S. population. This rate of increase exceeded the substantial rate of increase (103%) in numbers of plans. Rates of growth in plan enrollment were greatest in network and IPA models, which also reported the largest increases in numbers of plans. Networks increased from 0 to 4.5 million members from 1980 to 1985, reporting the third highest enrollment for all 4 plan types, while IPAs more than tripled enrollment, showing a 222% increase in members during this period. Staff models increased enrollment 79%, and group plan membership grew by only 13%. (These findings may reflect definitional changes in plan types in the Interstudy data. It is nevertheless significant that membership is distributed as described above across plan types defined across these 4 organizational prototypes.)

Group plans, while they show a very small overall increase in membership, retain the highest absolute enrollment and the highest mean enrollment per plan every year during the 1980-85 period. However, mean plan enrollment has been declining relative to other plan types: in 1980, the mean enrollment of group plans was 2.8 times as large as the next plan type (staff), while IPAs had the smallest mean enrollment. In 1985, group plans were only 1.5 and 1.7 times as large, on average, as network and staff plans, respectively, and IPAs remained the smallest. IPAs' small enrollment per plan may be due in part to the fact that the mean age of IPAs in 1985 was only 3 years, compared to 6, 8 and 12 years for network, group and staff models, respectively. These trends are shown in Table 5.2.1 and Figure 5.2.2.

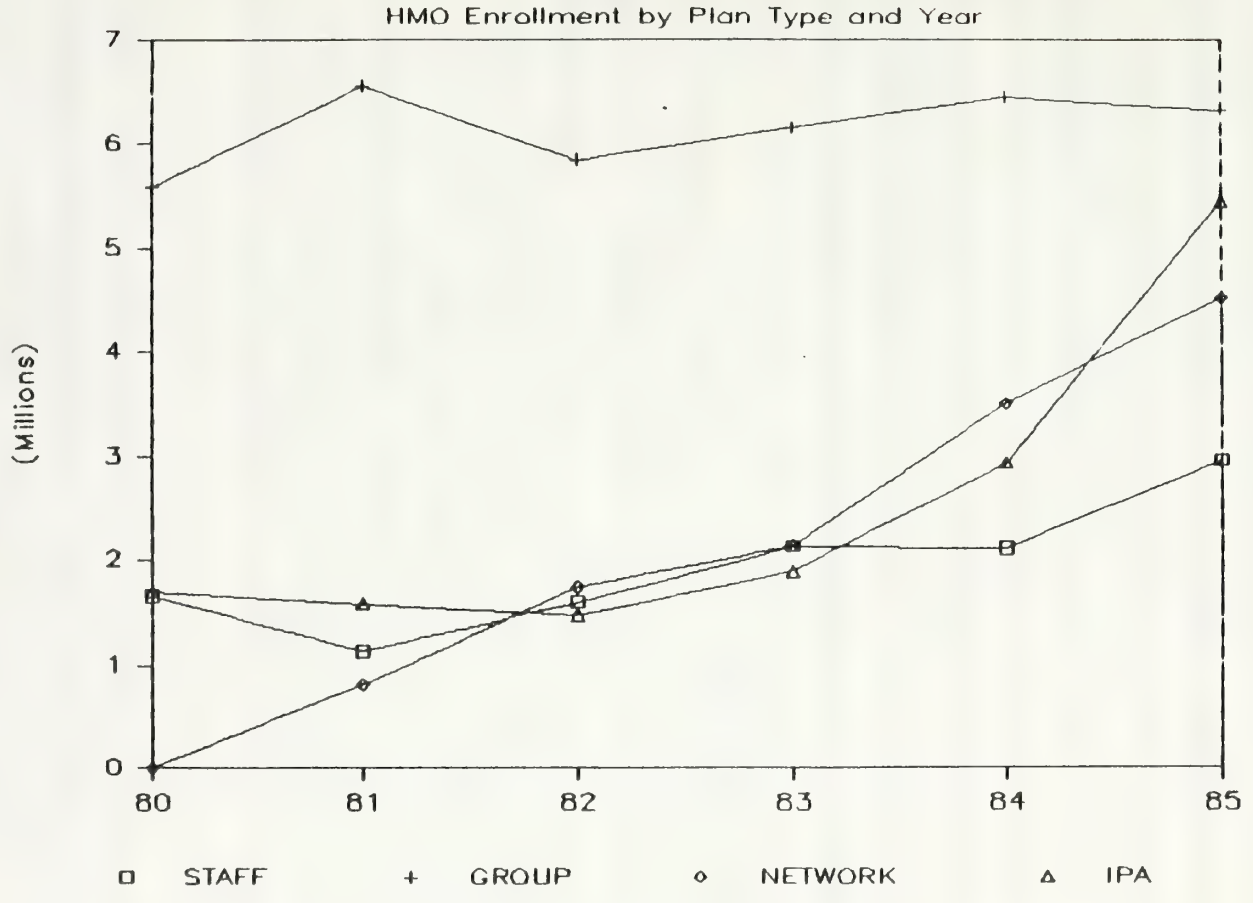
Overall plan size has grown from an average of 38,000 to 41,000 members over the period 1980-85. Both in 1980 and in 1985, more plans reported enrollments of around 10,000 members than any other size, but the trend across all model types is toward larger plans. (1980 and 1985 both have twice as many plans around 10,000 members than the next most prevalent plan size, reflecting many new plan start-ups.)

TABLE 5.2.1: HMO ENROLLMENT BY PLAN TYPE BY YEAR

	PLAN TYPE													
	STAFF			GROUP			NETWORK			IPA			ALL PLANS	
YEAR	Enrollment	%Total	Mean Enrollment	Enrollment	% Total	Mean Enrollment	Enrollment	% Total	Mean Enrollment	Enrollment	% Total	Mean Enrollment	Enrollment	Mean Enrollment
1980	1,651,476	18	26,637	5,585,046	63	75,474	0	0	0	1,694,211	19	17,466	8,930,733	38,329
1981	1,137,332	11	25,848	6,561,323	65	76,294	809,403	8	40,470	1,580,886	16	17,763	10,088,944	42,213
1982	1,594,031	15	28,465	5,846,489	55	74,006	1,739,087	16	57,970	1,466,942	14	15,281	10,646,549	40,791
1983	2,121,172	17	36,572	6,159,991	50	72,470	2,128,929	17	62,616	1,888,760	15	19,078	12,298,852	44,561
1984	2,102,350	14	36,247	6,454,407	43	88,417	3,497,263	23	59,276	2,926,538	20	20,609	14,980,558	45,122
1985	2,951,580	15	46,850	6,318,544	33	79,982	4,515,020	23	52,500	5,451,503	28	22,342	19,236,647	40,756
% Change 1980-85	79%			13%			458% (from 1981)			222%			115%	

Data Source: Interstudy National HMO Census

FIGURE 5.2.2:



Data Source: Interstudy National HMO Census

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Network and IPA models are achieving rapid gains in HMO membership, including one Medicare-only network with a reported membership in excess of 100,000 persons, but most of these increases are occurring in relatively new plans with small membership. Group models retain the largest absolute membership, including significant numbers of Kaiser plan enrollees, but group enrollment nevertheless decreased from 1984 to 1985, well below enrollment levels in 1981, the highest enrollment year for group plans. Several group model HMOs reportedly became networks during this period.

This trend of decreasing group model enrollment may reflect a slow erosion in future market potential for traditional group plans resulting from competition from the newer plan types and health insurance products. Also, more group models are older plans and are more likely to be developed to levels of federal qualifications than other model types, introducing additional influences on the comparative advantage of this model type.

5.3 Merger and Closure Activity

The extent to which plans undergo changes of ownership or close their doors in an increasingly competitive health care environment is important to access, continuity, and quality of care for prospective enrollee groups or members. Merger and closure activity may also provide some clues concerning the market strategy, or competitive viability of particular HMO types and their plan characteristics.

Early studies have provided limited information on this subject, with no clear consensus emerging. Most agree that each case must be considered individually, on its own merits. However, anecdotal information obtained during case study site visits and reports in trade journals and the popular press suggest that "take-overs" and plan mergers are occurring at an ever increasing pace. Mergers, in particular, are viewed as an effective means of expanding market share in developed HMO markets. Many HMOs are being acquired in growing numbers by national or regional HMO chains, or by large hospital or insurance corporations as joint ventures or multiple option offerings.

In the Tampa market, visited during case study site visits, both hospitals and HMOs have been subject to acquisition by large, national investor corporations. One of the area's new HMOs, sponsored as part of a multiple option by one of the nation's large indemnity insurers, reported that increasingly competitive markets, plan reserves and access to large pools of capital were critical to HMO success. This plan, like its other affiliates, was formed both by acquiring local IPAs and assembling new physician groups through networking arrangements. Acquisition and buyout are viewed by some Tampa HMOs as a lucrative survival strategy, and a source of significant returns to local providers.

Mobile, Alabama, as a smaller, less developed HMO market, has experienced the entry--and closure--of one national plan within the year, only months after enrolling over 2,000 members locally. One of Mobile's two remaining HMOs was undergoing massive restructuring of plan organization and management during site visits to the area, as part of a national chain take-over. The direction of change was unclear, creating momentary confusion for providers as well as members, but promised tighter, more standardized operations and control.

While much of this activity is recent, for example the purchase of the Health America chain by Maxicare at the end of 1986, some trends do appear through examination of National HMO Census data for the years 1980-85. Merger and closure activity reported below was in many cases inferred from the data, and is based on small numbers of cases;[1] findings below should be considered with these caveats in mind.

[1]Data on mergers were taken straight from lists of merged plans from the Interstudy National HMO Census between 1980 and 1985. Some reports include more complete information than others, which may reflect variations in reporting as well as variations in actual merger activity. A closure was defined as a plan existing in any year between 1980 and 1984 which did not exist the following year, was not known to have merged with another plan, and did not seem merely to have changed names. Plans identified as involved in mergers and closures include data for all plans involved in these activities.

Mergers

A total of 55 plans were involved in mergers between 1981 and 1985 (Table 5.3.1). The number has been increasing, although not steadily. The peak years for mergers, both in the number of mergers and their proportion of total plans, were 1982 and 1985, with 14 plans involved in mergers in 1982 out of a total of 261 (5.4%) operational plans and 19 out of 472 (4.0%) in 1985.

For many plans, mergers may provide a means for expanding market share or area--especially for group and network plans, which share many common organizational features that facilitate these arrangements between these plan types. Group plans and networks were involved in more mergers relative to their numbers (3.7% and 6.6%) than staff and IPA models (2.2% and 2.8%) over the five year period. Staff models, where the HMO owns its own facilities and pays salaries to its physicians, tend to be expensive to start up and to expand, especially in "secondary" markets where population density is likely to be less suitable to ensure adequate membership. IPAs are less costly to establish and may be more suitable to secondary market areas. IPAs (and networks) are frequently developed as alternatives, to compete with group and staff models--but tend to pose greater difficulty regarding management control, and are sufficiently different in organizational structure to make mergers with the other plan types less feasible.

Closures

A total of 95 plans closed between 1980 and 1984 (Table 5.3.2). The trends in closures seem to parallel those for mergers, with peak years occurring one year earlier. 1981 and 1984 had the largest number and proportion of closures, with 24 of 239 plans (10%) closing in 1981 and 26 of 332 (7.8%) closing in 1984. (This may reflect plan reorganization prior to participation in a merger or may be a product of variations in thoroughness of reporting from year to year.)

IPAs had by far the most closures (47) as well as the highest closure rate as a proportion of total IPAs (9.0% compared to 5.8%-6.3% for other plan types) over the

TABLE 5.3.1: HMOs INVOLVED IN MERGERS BY PLAN TYPE BY YEAR

	PLAN TYPE														
	STAFF			GROUP			NETWORK			IPA			ALL PLANS		
YEAR	Number of Plans	Number of Mergers	% Total Plans	Number of Plans	Number of Mergers	% Total Plans	Number of Plans	Number of Mergers	% Total Plans	Number of Plans	Number of Mergers	% Total Plans	Number of Plans	Number of Mergers	% Total Plans
1981	44	0	0	86	0	0	20	0	0	89	3	3.4	239	3	1.3
1982	56	2	3.6	79	5	6.3	30	1	3.3	96	6	6.3	261	14	5.4
1983	58	0	0	85	4	4.7	34	5	14.7	99	0	0	276	9	3.3
1984	58	0	0	73	4	5.5	59	3	5.1	142	3	2.1	332	10	3.0
1985	63	4	6.3	79	2	2.5	86	6	7.0	244	7	2.9	472	19	4.0
TOTAL	279	6	2.2	402	15	3.7	229	15	6.6	670	19	2.8	1580	55	3.5

Data Source: Interstudy National HMO Census

TABLE 5.3.2: HMO CLOSURES BY PLAN TYPE BY YEAR

	PLAN TYPE														
	STAFF			GROUP			NETWORK			IPA			ALL PLANS		
YEAR	Number of Plans	Number of Closures	% Total Plans	Number of Plans	Number of Closures	% Total Plans	Number of Plans	Number of Closures	% Total Plans	Number of Plans	Number of Closures	% Total Plans	Number of Plans	Number of Closures	% Total Plans
1980	62	7	11.3	74	3	4.1	0	0	--	97	8	8.2	233	18	7.7
1981	44	2	4.5	86	5	5.8	20	1	5.0	89	16	18.0	239	24	10.0
1982	56	2	3.6	79	4	5.1	30	3	10.0	96	5	5.2	261	14	5.4
1983	58	2	3.4	85	5	5.9	34	0	0	99	6	6.1	276	13	4.7
1984	58	3	5.2	73	6	8.2	59	5	8.5	142	12	8.5	332	26	7.8
TOTAL	278	16	5.8	397	23	5.8	143	9	6.3	523	47	9.0	1341	95	7.1

Data Source: Interstudy National HMO Census

five-year period 1980-1985. IPAs tend to be smaller and younger and more of them are in a tenuous start-up phase than older plan types, especially group and staff models which tend to be established plans with a stable base of members. Smaller plans of all model types were more likely to close, with 62% of closures occurring in plans with fewer than 10,000 members, and another 23% of closures reported for plans with 10,000 to 25,000 members (Table 5.3.3). Plan revenues and expenses per member month were available for only a small number of plans. However, 65% of closures among plans reporting these data occurred in unprofitable HMOs reporting incomes less than 95% of expenses per member month (Table 5.3.4).

The high failure of rural plans (there were 21 rural plans in 1980 and 44 in 1985, but 12 closures between 1980 and 1984, 10 of which had fewer than 10,000 enrollees) (Table 5.3.3) reflects the difficulties experienced throughout the 1970s with rural HMO development, which have continued into the 1980s. Although IPAs are more likely than other plan types to be found in rural areas, rural plans continue to face the unique problems of low population density, lower per capita incomes, and lower overall access to and utilization of health care services, which tend to dampen the comparative advantage necessary for HMO success operationally and financially.

5.4 Profitability

A cursory examination of the profitability of federally qualified HMOs (the only plans for which data are available) over the 1980 to 1984 period shows a considerable increase in industry profitability in reporting plans since 1980, in rural as well as in urban markets.[1]

[1]These findings are based on small numbers of plans (54% of HMOs reported revenues and expenses per member month in 1984, and 47% reported in 1980). In 1984, plans which did not report were generally the same age, had fewer members (21,000 vs. 66,000), and were in counties with a lower AAPCC rate (203 vs. 219) than plans reporting profits. Those not reporting in 1980 showed no significant difference in age or size from those reporting.

TABLE 5.3.3: HMO CLOSURES BY PLAN SIZE AND URBAN VS. RURAL LOCATION, 1980-84

PLAN SIZE	FREQUENCY ROW PERCENT COL PERCENT	LOCATION		TOTAL
		URBAN	RURAL	
	>25,000 Members	13 93% 16%	1 7% 8%	14 15%
	10,000 - 25,000 Members	21 95% 25%	1 5% 8%	22 23%
	<10,000 Members	49 83% 59%	10 17% 83%	59 62%
	TOTAL	83 87%	12 13%	95

Data Source: Interstudy National HMO Census

TABLE 5.3.4: HMO CLOSURES BY PLAN TYPE AND PROFIT MARGIN[1], 1980-84

PLAN TYPE	FREQUENCY ROW PERCENT COL PERCENT	PROFIT MARGIN >105	PROFIT MARGIN 95-105	PROFIT MARGIN <95	TOTAL
	STAFF	0 0% 0%	2 20% 25%	8 80% 40%	10 32%
	GROUP	0 0% 0%	3 50% 38%	3 50% 15%	6 19%
	NETWORK	1 50% 33%	1 50% 13%	0 0% 0%	2 6%
	IPA	2 15% 67%	2 15% 25%	9 69% 45%	13 42%
	TOTAL	3 10%	8 26%	20 65%	31

[1]Profit Margin = $\frac{\text{revenue per member month}}{\text{expense per member month}} \times 100$

Data Source: OHMO Annual Report and Interstudy National HMO Census

Reporting plans showed consistent improvement in profit margins (defined as revenue per member month/expense per member month x 100) from 1980 to 1984. Mean profit margins across plans increased from 87 in 1980 to 102 in 1984 (with break even at 100). Even when plans less than 2 years old (a start-up period during which plans are said to be most vulnerable to failure) are not included, this shift is still evident (Figure 5.4.1). Most of the very unprofitable plans and very few of the highly profitable plans are under 2 years in age.

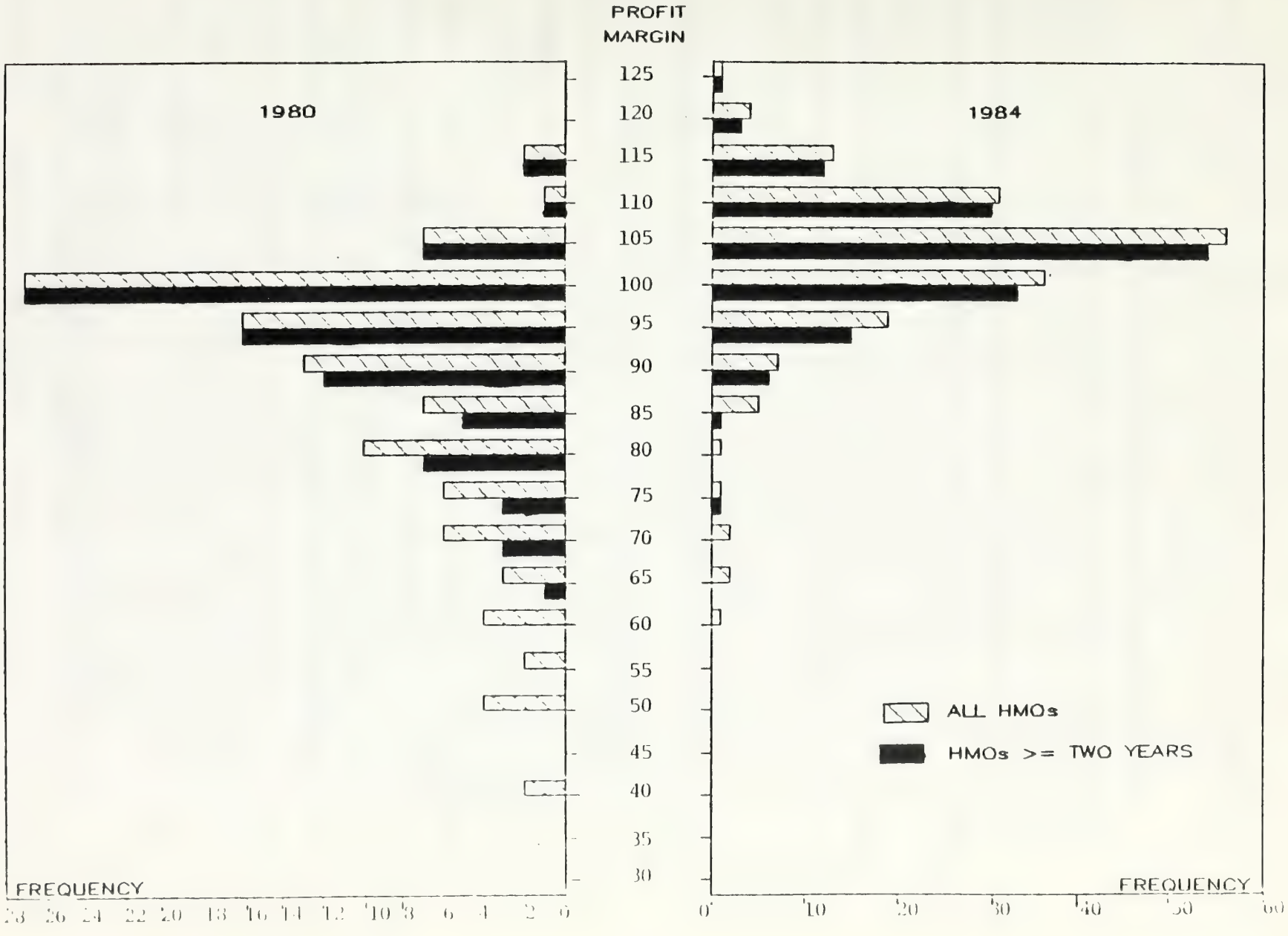
Plan profitability also tended to differ by model type, with some shift across plan types evident over the period 1980-1984 (Table 5.4.2). In 1980, group plans were doing better than other model types in terms of profitability: 59% of group plans were marginally profitable and 7% highly profitable, compared to 35% of staff plans which were marginally or highly profitable and 34% of IPA's. In 1984, all plans were doing better than in all previous years. Staff plans were doing best with 47% highly profitable, followed by 41% of IPA's, 35% of groups, and 33% of networks. Staff plans also had the lowest percent of unprofitable plans (only 8% compared to 15% to 20% for others). However, the general trend for all plan types at least 2 years old (typically more established and stable) is quite consistent: from being just slightly unprofitable on average in 1980 (95-100) to being just slightly profitable (100-105) in 1984.

5.5 Sponsorship and Profit Status

Discussions about the success or failure of HMOs usually begin by grouping plans into staff, group, network, or IPA models and then considering plan sponsorship (Luft, 1981). Sources of HMO sponsorship include medical societies, hospitals, universities, labor unions, community groups, health insurers, industries, municipal agencies, and health centers. HMO performance is conditioned, in turn, by the underlying motives of plan sponsors. For instance, consumer-sponsored plans embracing the "service ideal" of the HMO concept will operate differently from plans which may be attempting to fill

FIG 5.4.1

Distribution of HMOs by Profit Margin
1980 vs. 1984



Data Source: OHMO Annual Report

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TABLE 5.4.2: NUMBER OF HMOS BY PLAN TYPE AND PROFIT MARGIN*, 1980 vs. 1984

1980		PROFIT MARGIN				
			>105	95-105	<95	Total Freq. & All Plans
PLAN TYPE	STAFF	Freq.	1	11	22	34
		% All Staff	2.9	32.4	64.7	30.9
	GROUP	Freq.	2	17	10	29
		% All Group	6.9	58.6	34.5	26.4
	NETWORK	Freq.	0	0	0	0
		% All Network	0	0	0	0
	IPA	Freq.	2	14	31	47
		% All IPA	4.3	29.8	66.0	42.7
	TOTAL	Freq.	5	42	63	110
		% All Plans	4.6	38.2	57.3	100

1984		PROFIT MARGIN				
			>105	95-105	<95	Total Freq. & All Plans
PLAN TYPE	STAFF	Freq.	17	16	3	36
		% All Staff	47.2	44.4	8.3	20.1
	GROUP	Freq.	16	21	9	46
		% All Group	34.8	45.7	19.6	25.7
	NETWORK	Freq.	13	20	6	39
		% All Network	33.3	51.3	15.4	21.8
	IPA	Freq.	24	25	9	58
		% All IPA	41.4	43.1	15.5	32.4
	TOTAL	Freq.	70	82	27	179
		% All Plans	39.1	45.8	15.1	100

*Profit Margin = $\frac{\text{revenue per member month}}{\text{expense per member month}} \times 100$

>105 = highly profitable
95-105 = marginally profitable
<95 = unprofitable

Data Source: OHMO Annual Report

empty hospital beds, to earn a sizable profit, or to drive out competitiors within the local area.

An issue directly related to sponsorship and organizational goals is whether for-profit or non-profit status influences HMO performance. Historically, most HMOs have operated as non-profit organizations. Recently, with the shift to increasingly competitive industry structures, increasing numbers of HMOs have chosen to establish or reorganize as for-profit plans, often to further plan expansion and growth. The primary disadvantage of for-profit status has been the restricted access to federal loans for planning and start-up costs; however, for-profit plans have better access to capital markets than non-profit HMOs. Many new HMOs are for-profit plans, affiliated with national HMO firms.

The number of for-profit plans has substantially increased as a percentage of all HMOs between 1981 and 1985, as has their membership. The increase in for-profit plans, many of which are regionally or nationally affiliated, is perceived as a significant threat to many independent, non-profit HMOs. In 1985, the only year for which profit status is available through Interstudy data, the proportion of non-profit and for-profit HMOs was about equal (48% and 52% respectively) (Table 5.5). Some model types, however, reported a higher proportion of for-profit plans than others. IPAs had the highest proportion of for-profit plans among this model type (57%), followed by 51% of network plans, 47% of group models, and only 38% of staff models. For all plan types but staff models, non-profit HMOs are larger on average. This is apparent especially in group models where 53% of plans are non-profit, but they enroll 84% of group model enrollees. (This particular figure may be skewed by the large enrollment of non-profit Kaiser Permanente plans.)

5.6 Federal Qualification

Federal qualification is a hotly debated issue for plans seeking to compete in local markets. Many federally qualified plans in states where dual option provisions do

TABLE 5.5: HMO PROFIT STATUS BY BY PLAN TYPE, 1985

1985	PLAN TYPE									
	STAFF		GROUP		NETWORK		IPA		ALL PLANS*	
PROFIT STATUS	% All Staff	% Total Enrollment	% All Group	% Total Enrollment	% All Network	% Total Enrollment	% All IPA	% Total Enrollment	% Total	% Total Enrollment
NON-PROFIT	62	59	53	84	49	63	43	51	48	66
FOR-PROFIT	38	41	47	16	51	37	57	49	52	34

*98% of all plans in 1985 reported profit status.

Data Source: Interstudy National HMO Census

not exempt plans from requirements that may limit market advantage, are finding it increasingly difficult to compete with non-qualified plans and with PPOs that are entering markets in growing numbers.

Federally qualified plans, because they have been favored by federal regulation which requires employers to offer federally qualified plans to employee groups of 25 or more, have been required to use average community rates as the basis for their premiums except where state regulation exempts plans from this requirement. This rating system includes the costs of care for all people in the plan's service area -- the very sick and the working well. Federally qualified plans must also provide minimum benefit levels.

Non-qualified plans do not receive the benefits of qualification status, i.e., employers are not required to offer non-qualified plans. Under current federal administration it is uncertain whether this regulation will endure, with some industry experts predicting lapse of the HMO Act by 1988. Already, government officials have sanctioned non-qualified plans, known as Competitive Medical Plans (CMPs) for contracting and enrollment of beneficiaries with the Medicare program. For employee groups, non-qualified plans can provide pared-down benefit packages, with restrictions, at lower premiums based on the utilization experience of each particular group. This option tends to be favorable to companies and working populations, which tend to be healthier than community experience overall. Federally qualified plans usually rely on non-price competition in markets where experience-rated plans are competitors, because federally qualified plans have less flexibility to set premiums and often must justify the broad scope of benefits and administrative control required by regulation.

The total number of federally qualified plans across all plan types remained fairly constant at about half of all plans from 1980 to 1982, increased to its highest proportions in 1983 (59%), and then leveled off to 57% for 1984 and 1985. Further industry changes in 1986, including the acquisition of federally qualified plans by non-qualified chains are rapidly eroding the numbers of federally qualified plans.

In 1985, group models and networks had the highest proportion of federally qualified HMOs among their plans (72% and 70%, respectively) (Table 5.6). Staff models also reported a large proportion of federally qualified plans (57%). Fewer than half (48%) of all IPAs were federally qualified in this same year. These proportions for all plan types tend to fluctuate a great deal over the years. Group plans, which had the highest proportion of federally qualified plans within a single model type, accounted for the lowest proportion across plan types in 1980. Networks had the highest average proportion of federally qualified plans across all years, while IPAs were by far the lowest in all years after 1980.

5.7 Industry Summary

The HMO industry continues to transform itself rapidly in the 1980's, and particularly so since 1983, with the introduction of the PPS. A variety of new organizational and financing structures have gained a foothold in the market, with particular growth among IPA and network models. These plans are contractually based, and many place individual or group practitioners at full or partial risk for overutilization of services that exceed the costs of capitation.

Many IPAs and networks are affiliated with, being acquired by, or are merging with large hospital chains and insurance companies. This means of achieving comparative advantage through monopsony is especially suited to IPA and network plan types. Although average plan size is small for most IPA and network plans, their cumulative market penetration is growing as a percentage of all plans.

Group and staff model plans are solid performers. The group model is best illustrated by Kaiser Permanente plans, which dominate enrollment in this model type. Kaiser plans were recognized as "model" plans during the 1970's, but they are not typical of all group plans, nor representative of the HMO industry as a whole. These plans are facing growing competition from non-qualified plans, for-profit HMOs, regionally and nationally affiliated plans, and other HMO and insurance products.

TABLE 5.6: FEDERALLY QUALIFIED HMOs BY PLAN TYPE BY YEAR

	YEAR												
	1980		1981		1982		1983		1984		1985		1980-85
PLAN TYPE	Number FQ	% All Plans	Number FQ	% All Plans	Number FQ	% All Plans	Number FQ	% All Plans	Number FQ	% All Plans	Number FQ	% All Plans	Average %
STAFF	38	61	25	57	36	64	39	67	37	64	36	57	62%
GROUP	33	45	46	53	44	56	54	64	46	63	57	72	59%
NETWORK	0	--	11	55	17	57	19	56	42	71	60	70	65%
IPA	48	49	41	46	40	42	50	51	64	45	116	48	47%
ALL PLANS	119	51	123	51	137	52	162	59	189	57	269	57	

Data Source: Interstudy National HMO Census

HMO growth, overall, has been strong, and profitability has improved. Whether the introduction of the PPS is likely to alter these trends is explored in the following section.

6.0 PPS Effects on HMO Availability

The rapid growth experienced by the HMO industry in the 1980s has increased the numbers of plans significantly. Whether the PPS has influenced this growth, by affecting HMO comparative advantage or through other means is a particular concern of this evaluation. The possible attribution of PPS effects on HMO comparative advantage on plan availability should become evident by examining patterns of variation in HMO market entry and growth across local health care market areas: while it is indisputable that the industry experienced tremendous growth, especially after the introduction of the PPS, it is important to consider the distribution of industry activity across local markets in relation to the strength of PPS influence on hospitals in these same areas. For example, have hospitals in certain market areas been more severely penalized, or more generously rewarded under the PPS such that PPS-related changes in hospital markets have reduced the comparative advantage of HMOs in those areas?

Because the PPS was designed as a budget neutral system, the diverse incentives of the new payment system are effectively distributive. The intent of these incentives is to standardize hospital payments to a normative, national level. Hospital payments, under the fully implemented PPS, should approach an average, national rate for each DRG. Hospitals with higher than average Medicare patient care costs, or higher than average utilization for Medicare should be more severely affected by the PPS, and are expected to more vigorously attempt reductions in cost and length of stay. Hospitals with lower than average cost and utilization are likely to feel under less pressure to change their behavior in response to the PPS. These hospitals may, in fact, receive generous windfalls under the new system of hospital payment.

This section explores whether and how the aggregate, distributional impacts of the PPS in hospital markets may affect the comparative advantage and availability of HMOs in their markets. It is expected that PPS effects on HMO availability will be greatest in areas where the PPS has effected significant changes in hospital markets.

reducing or improving HMO comparative advantage relative to the fee-for-service sector. Changes in HMO market share and plan growth were examined before and after the introduction of the PPS, focusing on PPS effects on market entry, market penetration, numbers of plans and plan enrollment. The PPS "gain" variable, constructed as an indicator of the PPS effect on countywide hospital revenues under the fully implemented system, and the measure of variability in "gain" across hospitals at the county level provide potential key indicators of the effect of the PPS on county health care markets. Combined with county level data on supply and demand characteristics, including HMO penetration, market profiles were generated to address these questions.

6.1 HMO Markets and the PPS

It is first important to consider whether and how the PPS is expected to affect local health care markets, and then examine whether and how the PPS may differentially affect markets where HMOs are located and where they are not located. Plans are expected to locate in areas where they are able to provide care more efficiently than the fee-for-service sector, by serving "healthy" populations. The unique and common characteristics of local markets where HMOs are currently located, and the (expected) impact of PPS on these markets may encourage or discourage HMO development. In areas not served by HMOs, has the PPS impact on hospitals helped to encourage or further restrict growth to these areas? Can common characteristics of local markets be identified with respect to expected PPS impacts, HMO market share and growth? This section explores local HMO markets and trends in HMO location and availability. Expected PPS impacts in characteristically different markets are also examined, both with respect to PPS gains and losses in the aggregate and across hospitals in a market area.

HMOs are predominantly located in and serve urban areas (Table 6.1.1). In 1980, 91% of plans (212 of 233) were located in urban markets; this percentage remained stable through 1985, with 428 of 472 HMOs located in urban areas. Of all plan types,

TABLE 6.1.1: URBAN AND RURAL HMOs BY PLAN TYPE, 1980 vs. 1985

	PLAN TYPE									
	STAFF		GROUP		NETWORK		IPA		ALL PLANS	
1980	Number	% All Staff	Number	% All Group	Number	% All Network	Number	% All IPA	Number	% Total
URBAN	61	98.4	69	93.2	0	0	82	84.5	212	91.0
RURAL	1	1.6	5	6.8	0	0	15	15.5	21	9.0
% ALL RURAL	4.8		23.8		0		71.4		100.0	

	PLAN TYPE									
	STAFF		GROUP		NETWORK		IPA		ALL PLANS	
1985	Number	% All Staff	Number	% All Group	Number	% All Network	Number	% All IPA	Number	% Total
URBAN	61	96.8	71	89.9	76	88.4	220	90.2	428	90.7
RURAL	2	3.2	8	10.1	10	11.6	24	9.8	44	9.3
% ALL RURAL	4.6		18.2		22.7		54.6		100.0	

Data Source: Interstudy National HMO Census

staff models were proportionately more likely to be located in urban markets (97%), although the other model types were not far behind with 88% to 90% in urban areas.

HMOs continue to be in short supply in rural areas. The total number of rural plans increased from 21 of 233 plans in 1980 to 44 of 472 plans in 1985, and accounted for only 9% of all plans in both of these years.

IPA models constituted the largest number and proportion of rural HMOs of all plan types during the 1980s. In 1980, 71% of rural plans were IPAs and the number of rural IPAs proportional to all IPAs was higher (15%) than for any other plan type. By 1985, the proportion of rural plans that were IPAs dropped to 55%, and networks replaced IPAs in having the highest proportion of rural plans relative to all networks (12%), but there were still twice as many IPAs as any other plan type in these areas. Networks and group plans followed at 23% and 18% of all rural plans, while staff plans still constituted just 5% of rural plans.

For all years, rural plans across model types tend to be smaller than urban plans: 76% of rural plans have under 10,000 members, and only 10% have more than 25,000 members. Urban plans, by comparison, tend to be larger in size, with 48% under 10,000 members and 25% percent with enrollments larger than 25,000 members (data table not shown).

The number of U.S. counties served by HMOs has been increasing steadily from 18% of all counties in 1980 to 33% in 1985, with the largest jump in number between 1984 and 1985, following implementation of the PPS (Table 6.1.2). The counties with HMOs are more densely populated than those without: 60% of the nation's population lived in the 18% of counties with HMOs in 1980 and 77% of the population lived in the 33% of counties served in 1985. This shows a dramatic increase in the availability of HMOs, especially in recent years. However, these new plans are likely to be located in new counties within the same SMSA, reflecting new or expanded market share, but not substantially increasing availability of plans in unserved areas.

TABLE 6.1.2: GROWTH IN PROPORTION OF COUNTIES AND PEOPLE SERVED BY HMOs, 1980-85

	YEAR											
	1980		1981		1982		1983		1984		1985	
COUNTIES	% of Counties	% of Pop	% of Counties	% of Pop	% of Counties	% of Pop	% of Counties	% of Pop	% of Counties	% of Pop	% of Counties	% of Pop
SERVED BY HMOs	18	60	20	62	23	65	24	67	27	71	33	77
NOT SERVED BY HMOs	82	40	80	38	77	35	76	33	73	29	67	23

Data Source: AAI County-Level File (see Ch. 4).

HMO markets appear to be deepening in urban areas, increasing the availability of plans in "competitive" areas already served by plans, rather than expanding access to undeveloped, unserved areas. The number of new HMOs entering urban areas without previous HMOs has declined from 48% (21 of 44 plans) in 1980 to only 20% (27 of 133 plans) in 1985, as the proportion of urban counties served continues to increase overall (Table 6.1.3). However, in rural areas almost one-half of plans are entering new counties (measured by location, not service area), although rural HMO development, noted previously, continues at low levels.

The deepening of urban markets appears to reflect the entry of IPAs and networks as a competitive response to the presence of staff or group model HMOs. In rural areas, however, IPAs and networks, which tend to be more organizationally adaptable to less densely populated areas and rely on the availability of providers already present in a market, are more likely to enter the market, often as the first entrants. More than 80% of the time when an IPA or network enters an urban area, there was already (or that same year) a staff or group model in the same SMSA. In rural areas, however, IPAs and networks are the first entrants over one half of the time (68% in 1985).

6.2 PPS "Gains" in Areas Served or Not Served by HMOs

To further investigate HMO location, to determine whether HMOs were likely to be located in markets with distinctive characteristics, and to examine the influence of the PPS in these areas, counties were separated into those counties served by an HMO in 1985, and those counties that had no access to HMOs. Analysis of variance (ANOVA) and discriminant analysis were performed to examine the relationships between county characteristics and HMO availability. These results are described in Table 6.2 below.

This table shows means on market characteristics for counties served and not served by HMOs. One-way ANOVA results for each market variable are reported as F statistics, and showed that most of these factors (all except BIRTH and GAINLR_C) had

TABLE 6.1.3: WHETHER NEW HMOs ARE ENTERING NEW OR OLD URBAN[1] AND RURAL[2] MARKETS

URBAN YEAR	NUMBER OF NEW HMOs	% IN OLD MARKETS	% IN NEW MARKETS
1980	44	52.3	47.7
1981	20	65.0	35.0
1982	38	73.7	26.3
1983	24	62.5	37.5
1984	57	68.4	31.6
1985	133	79.7	20.3
TOTAL	316	70.9	29.1

RURAL YEAR	NUMBER OF NEW HMOs	% IN OLD MARKETS	% IN NEW MARKETS
1980	3	66.7	33.3
1981	0	0	0
1982	3	33.3	66.7
1983	2	0	100.0
1984	9	33.3	66.7
1985	16	56.3	43.8
TOTAL	33	45.5	54.6

[1]A new urban market is an SMSA in which no HMOs previously were located.
[2]A new rural market is a county in which no HMOs previously were located.

Data Source: Interstudy National HMO Census.

TABLE 6.2: MARKET CHARACTERISTICS OF COUNTIES WITH OR WITHOUT HMOs, 1985

	CLASS MEANS			
	HMO	NO-HMO	F	PROB>F*
BIRTH	1518.53	1512.53	0.25	0.62
POPDENS	550.60	50.95	49.76	0.00
P65GT	0.12	0.14	230.85	0.00
SMSA	0.55	0.08	936.47	0.00
CAPINC	10.73	9.08	423.82	0.00
CPIPCT	3.38	3.32	9.11	0.00
EMPLARG	0.0003	0.0006	59.78	0.00
HERFINDX	0.16	0.19	28.72	0.00
AARATEAB	169.51	151.12	195.26	0.00
PHYSPOP	115.66	78.94	110.38	0.00
NHB	1127.65	238.77	233.93	0.00
GAINLR_C	0.04	0.03	1.71	0.19
GAINLR_V	0.04	0.02	164.78	0.00
STGHU_AV	0.67	0.59	155.35	0.00

*ONE-WAY ANOVA

TABLE 6.2 (continued)

RAW CANONICAL COEFFICIENTS

	CAN1
BIRTH	-0.00
POPDENS	0.00
P65GT	-5.69
SMSA	2.03
CAPINC	0.14
CPIPCT	-0.22
EMPLARG	6.70
HERFINDX	-2.76
AARATEAB	0.00
PHYSPOP	-0.00
NHB	0.00
GAINLR_C	-0.02
GAINLR_V	1.06
STGHU_AV	0.71

CLASS MEANS ON CANONICAL VARIABLES

HMO	0.97
NO-HMO	-0.54

	CAN CORR	ADJ CORR	SE	F	DF	PROB>F
CAN1	0.59	0.58	0.01	93.94	14	0.00

Data Source: AAI County-Level File (see Chapter 4)

significantly different means across the different county groups at .01 levels of significance. Discriminant analysis seeks to examine how these variables as a group differ in counties served and counties not served by HMOs. Raw canonical coefficients (all variables have been standardized) are interpretted like regression weights, and represent the relative influence of each variable to in classifying these counties. CAN1 represents the linear combination of and the relative importance of these variables that best classify counties served and not served by plans. Counties with positive class or group means tend to have higher values for positive canonical coefficients; counties with negative class means tend to have higher values on negative coefficients. A weighted average of all the variables (weighted by the coefficients in Table 6.2) has a mean value of .97 in counties served by HMOs as compared with a mean of -.54 in counties not served by HMOs. For example, counties served by HMOs are distinguished from counties not served by HMOs by their coefficients corresponding to higher values for SMSA location, CAPINC, EMPLARG, GAINLR_V and STGHU_AV. Positive or negative 0.00 value coefficients have been rounded but also refer to group membership, although these variables add little to the group classification. Examining these variables together, rather than individually as with ANOVA, indicates the relative importance of these variables in classifying counties. POPDENS, for example, is statistically significant individually, but provides little influence to classification when combined with other market variables. Statistical significance for the entire set of characteristics is provided by F statistics produced for the canonical discriminating function. (These classification criteria significantly distinguish between groups.)

Discriminant analysis shows that counties served by HMOs tended to be located in metropolitan areas, and were likely to have a higher population density, higher per capita income, and more large employers when market area characteristics were used to classify the counties nationwide that are served or not served by plans. HMOs also tended to serve counties with higher hospital occupancy rates, higher per capita total

health care expenditures (the AAPCC for Medicare beneficiaries was used as a proxy for all age groups), and were distinguished by a higher degree of competition in local hospital markets. The anticipated countywide impact as measured by PPS ("gain") in areas served by HMOs was slightly less than in counties without HMO access, which experienced slightly larger increases in revenue under the PPS. Counties served by HMOs did tend, however, to experience greater variation in PPS "gain" across hospitals than counties not served by the plans.

Counties that were not served by HMOs in 1985--areas with a high percentage of residents above age 65, a higher rate of inflation, and less competitive hospital market--and were expected to experience slightly greater long run gains under the PPS. Similar profiles and overall levels of statistical prediction appear when 1980 county characteristics are used to distinguish counties served by HMOs from those not served by HMOs in 1985. An important observation from these findings is that the characteristics of market areas do not tend to change, at least in the short run. Those areas least attractive to HMOs have remained unattractive and are unlikely to provide fertile markets for plan development in the near future.

These profiles confirm what HMO industry watchers have argued for several years: that HMOs do tend to locate in areas where the potential for comparative advantage is greater, evidenced by the locational characteristics of their markets relative to the fee-for-service sector. Some areas may be extremely hard pressed to attract HMO development or access due to their "unattractive" market characteristics--for example a rural location with its corresponding market features. That many elderly reside in these areas may pose a significant challenge for advocates of Medicare managed care through HMO-type plans in their current forms of organization (even though IPAs, at present, may provide some promising experience in rural areas).[1] However, population density and fee-for-service costs also appear to be lower in these

[1]See Section 6.1.

areas. This suggests that managed care may not necessarily provide alternatives that are less costly than the fee-for-service sector, although HMOs and other managed care approaches may be desirable to improve utilization and access to health services in areas of underservice and undersupply.

The PPS does appear to have a differential expected impact on hospital markets in areas that are served by HMOs and those without HMO access: the PPS appears to slightly favor hospitals in terms of market-wide "gain" in areas not served by HMOs. Many of these areas are less than desirable for HMO market entry or growth. Areas where HMO activity is flourishing, areas with higher costs and utilization, are expected to experience fewer "gains" under the PPS. This effect may place greater long-run pressure on hospitals in these areas to reduce utilization and cost. Whether levels of cost and utilization are appropriate to the health care needs of local populations requires monitoring over time. If the above scenario does in fact occur, at levels of any significance, it may reduce HMO comparative advantage in these areas over time. More detailed examination of PPS effects in selected HMO market areas may provide further insight into this issue.

6.3 PPS and HMO Market Penetration

The relationship between PPS "gain" and HMO market penetration, i.e. the percentage of the population enrolled in an HMO, was examined for 1985 at the county level using ordinary least squares regression methods. Findings from this model are shown in Table 6.3.

Neither PPS "gain" for hospitals, aggregated to the county level, nor the variability in "gain" across hospitals were significantly related to HMO penetration. HMO penetration was positively related to whether or not the county was located in a SMSA, mean per capita income, higher inflation, greater hospital market competition (HERFINDX), nursing home beds per capita, and year-to-year increases in inflation (measured by the regional consumer price index). The presence of fewer large employers

TABLE 6.3: HMO PENETRATION 1985

	PARAMETER ESTIMATE	T VALUE	PROB>|T|
INTERCEP	-4.03	-3.11	0.00
BIRTH	0.00	0.47	0.64
POPDENS	-0.00	-0.54	0.59
P65GT	-4.89	-1.81	0.07
SMSA	4.67	17.14	0.00
CAPINC	0.42	7.82	0.00
CPIPCT	0.60	2.83	0.00
PHYSPOP	-0.00	-0.94	0.35
NHB	0.0007	8.75	0.00
EMPLARG	-249.36	-2.21	0.03
HERFINDX	-5.89	-9.05	0.00
AARATEAB	0.01	1.79	0.07
GAINLR_C	0.19	0.26	0.79
GAINLR_V	-3.23	-1.42	0.16
STGHU	-0.95	-1.59	0.11

F VALUE	PROB>F	R-SQUARE	ADJ R-SQ
95.40	0.00	0.35	0.34

Data Source: AAI County-Level File (see Chapter 4)

(1,000 or more employees) in an area and higher per capita expenditures for health care (the AAPCC for Medicare was used as a proxy), were also related to higher levels of HMO penetration, at slightly lower levels of significance (.03 and .07, respectively).

The per capita supply of physicians was also unrelated to HMO penetration. Short-term hospital occupancy rates in 1985 were not significantly associated with HMO penetration; however, when 1980 hospital occupancy rates were substituted in the same model (results not shown), they were slightly significant and showed a stronger, positive relationship to HMO penetration than 1985 values. This may reflect the effects of HMO presence (or the influence of other competitive market features) on reducing hospital occupancy rates in local markets over time, or the effects of hospital occupancy rates on HMO penetration.

6.4 Changes in HMO Penetration, 1980-1985

The effect of the PPS on changes in HMO penetration in 1985, measuring HMO membership growth as a percentage of county population over the period 1980 to 1985 was examined using ordinary least-squares regression methods to see whether the PPS might be expected to encourage or discourage HMO membership growth and whether a directional effect could be detected in markets with particular characteristics. The analysis included county market descriptors for 1980, with rates of HMO penetration and hospital utilization in that same year, to observe the relationship between HMO growth and pre-existing county market conditions. The impact of the PPS on growth over this period was also examined. Findings are presented in Table 6.4.

Features of counties in 1980 that were found to be significantly related to growth in county HMO penetration over the 1980-85 period included younger populations (those with lower proportions of county residents over age 65), urban locations, higher per capita incomes, greater availability of nursing home beds per capita, and previously high levels of HMO market penetration. Lower physician-to-population ratios were also

TABLE 6.4: CHANGE IN HMO PENETRATION, 1980-85

	PARAMETER ESTIMATE	T VALUE	PROB>|T|
INTERCEP	3.00	2.27	0.02
1980 BIRTH	-0.00	-1.38	0.17
1980 POPDENS	-0.00	-1.40	0.16
1980 P65GT	-6.78	-4.21	0.00
1980 SMSA	2.80	16.49	0.00
1980 CAPINC	0.18	4.18	0.00
1980 CPIPCT	-0.15	-1.70	0.09
1980 EMPLARG	-0.72	-0.01	0.99
1980 PHYSPOP	-0.003	-3.17	0.00
1980 NHB	0.0002	4.55	0.00
HERFINDX	-3.60	-8.81	0.00
GAINLR_C	0.16	0.38	0.71
GAINLR_V	-3.65	-2.54	0.01
1980 STGHU	0.72	1.73	0.08
1980 HMOPOP	0.18	9.71	0.00

F VALUE	PROB>F	R-SQUARE	ADJ R-SQ
80.58	0.00	0.31	0.31

Data Source: AAI County-Level File (see Chapter 4)

significantly associated with higher rates of growth in HMO market share. HMO penetration has also increased most in areas with most competitive hospital markets (low HERFINDX scores).

Aggregate gains and losses to hospitals under the PPS at the county level are not related to growth in HMO market share. However, HMO market share tended to grow less quickly where there was greater diversity in the market in terms of PPS impact (GAINLR_V). This trend, if corroborated by further study, may suggest that variation in PPS effects across hospitals may be related to other sources of impact for HMOs and non-hospital providers and should be investigated with respect to actual PPS effects on the appropriateness of changes in availability and access to health care at the local level.

The importance of prior (1980) levels of HMO penetration in predicting rates of growth in HMO market share over the 1980-85 period is consistent with univariate trends described previously, which show that the entry of new HMOs is occurring most frequently in established markets. The aggregate expected "gain" of the PPS appears to have little short term effect on rates of growth in HMO penetration over this period although variability of PPS "gain" and the competitiveness of hospital markets do appear to be related to growth in market penetration. The influence of these factors is rather weak, however; the entire set of market area variables specified for the multivariate model explain only 31% of the growth in the HMO penetration across counties in the first half of the decade.

6.5 Distributional Effects of the PPS

While the expected impact of the PPS does not appear to be significantly related to HMO penetration at aggregate county levels, the expected PPS impact across counties may vary according to local market conditions. As described above, variability in the expected PPS impact was significantly related to slower county-level growth in HMO penetration. Expected distributional county-level effects are examined in Table 6.5.1, which shows the characteristics of counties expected to experience gains or losses

TABLE 6.5.1: MARKET CHARACTERISTICS OF AREAS WITH GAINS OR LOSSES UNDER THE PPS, 1985

	CLASS MEANS			
	GAIN	LOSS	F	PROB>F*
BIRTH	1535.68	1502.11	7.91	0.01
POPDENS	146.83	279.06	3.49	0.06
P65GT	0.14	0.13	4.93	0.03
SMSA	0.13	0.32	119.90	0.00
CAPINC	9.78	9.60	4.55	0.03
CPIPCT	3.37	3.33	4.93	0.03
EMPLARG	0.00	0.00	3.71	0.05
HERFINDX	0.17	0.18	10.55	0.00
PHYSPOP	93.43	91.26	0.38	0.54
NHB	588.40	537.56	0.71	0.40
HMOPOP	1.76	2.42	9.10	0.00
GAINLR_V	0.02	0.03	7.08	0.01
STGHU_AV	0.61	0.63	10.95	0.00
AARATEAB	168.25	151.39	165.74	0.00

*ONE-WAY ANOVA

TABLE 6.5.1 (continued)

RAW CANONICAL COEFFICIENTS

	CAN1
BIRTH	0.00
POPDENS	-0.00
P65GT	1.37
SMSA	-2.14
CAPINC	0.05
CPIPCT	0.05
EMPLARG	11.92
HERFINDX	0.43
PHYSPOP	0.00
NHB	0.00
HMOPOP	-0.01
GAINLR_V	-1.72
STGHU_AV	0.11
AARATEAB	0.03

CLASS MEANS ON CANONICAL VARIABLES

GAIN	0.60
LOSS	-0.36

	CAN CORR	ADJ CORR	SE	F	DF	PROB>F
CAN1	0.42	0.41	0.02	38.28	14	0.00

Data Source: AAI County-Level File (see Chapter 4)

under the PPS, and results of ANOVA and discriminant analyses for "winning" and "losing" counties.

Multivariate results showed that counties where hospitals are expected to experience gains were much less densely populated, have more nursing home beds per capita, and have higher AAPCC rates than counties experiencing losses. Counties that are expected to gain under the PPS tended to have more large employer groups, less hospital market competition, and higher hospital utilization rates than counties expected to lose revenue under the PPS. Counties expected to experience losses under the PPS tend to be metropolitan areas with apparent variation in PPS impact across hospitals within a county. Many county markets most likely to be in need of PPS efficiency incentives--those with higher health care costs and hospital utilization--are expected to experience gains, rather than pressure for greater efficiency under the PPS. Whether high costs and utilization reflect overutilization or greater need in these areas requires further investigation.

The expected effect of the PPS in counties experiencing gains or losses, and its potential influence on HMO market entry and growth, is likely to vary in accordance with the structure of the hospital market, and the capacity of local markets to accommodate to these changes. Table 6.5.2 shows differences in PPS effect for solo hospital counties and for counties with concentrations of 4 or more hospitals. Solo hospital counties (i.e, poor rural counties) with losses expected under PPS were also counties with the lowest HMO market penetration in 1985. Counties with larger hospital markets that are expected to experience losses under the PPS were counties with the highest mean HMO penetration.

Table 6.5.3 shows mean HMO penetration rates in both urban and rural areas experiencing gains and losses under the PPS. Rural counties expected to experience gains in revenue under the PPS are counties that had the lowest mean HMO penetration in 1985. Many of these counties had no HMO membership. Urban counties experiencing

TABLE 6.5.2: HOSPITAL LONG-RUN GAINS AND LOSSES UNDER THE PPS BY NUMBER OF HOSPITALS IN COUNTY, 1985

	PPS "GAIN"			
	GAIN (+)		LOSS (-)	
COUNTIES	FREQUENCY	MEAN HMO PENETRATION	FREQUENCY	MEAN HMO PENETRATION
SOLO HOSPITALS	922	1.27%	574	0.81%
>4 HOSPITALS	128	7.97%	82	8.47%

TABLE 6.5.3: HOSPITAL LONG-RUN GAINS AND LOSSES UNDER THE PPS BY URBAN OR RURAL LOCATION, 1985

	PPS "GAIN"			
	GAIN (+)		LOSS (-)	
COUNTIES	FREQUENCY	MEAN HMO PENETRATION	FREQUENCY	MEAN HMO PENETRATION
URBAN	526	9.51%	195	6.29%
RURAL	1070	0.47%	1280	0.63%

Data Source: AAI County-Level File (see Chapter 4).

the greatest gains under the PPS reported the highest mean HMO penetration for this same year.

HMO enrollment in counties expected to experience gains under the PPS and enrollment in counties expected to experience losses are almost equal for every year between 1980 and 1985 (Table 6.5.4). Overall increases in enrollment for the two types of counties are also nearly equal: 116% growth was reported for counties expected to have gains and 118% growth for counties expected to have losses. Although growth in enrollment in losing counties was greater than for winning counties in 1983 and 1984, winners had greater enrollment increases in 1985. Whether this will affect HMO availability or organization over time will be examined by policymakers and the industry through future years.

TABLE 6.5.4: HMO ENROLLMENT AND PERCENT CHANGE OVER PREVIOUS YEAR
BY COUNTY GAIN OR LOSS UNDER THE PPS, 1980-85

PPS "GAIN"	YEAR											
	1980		1981		1982		1983		1984		1985	
	Enrollment	% Change	Enrollment	% Change	Enrollment	% Change	Enrollment	% Change	Enrollment	% Change	Enrollment	% Change
GAIN (+)	4,388,880	--	4,908,941	11.8	5,237,535	6.7	6,008,006	14.7	7,307,980	21.6	9,475,769	29.7
LOSS (-)	4,346,239	--	4,977,087	14.5	5,230,716	5.1	6,100,671	16.6	7,472,840	22.5	9,480,987	26.9

Data Source: AAI County-Level File (see Chapter 4).

7.0 HMO Behavior and the PPS

Behavioral changes in the HMO industry can be anticipated as a dynamic of competition and the introduction of PPS as plans seek to maintain or achieve comparative advantage over the fee-for-service sector. Industry changes in model type, identified as trends in Section 6, represent adaptations by the industry to a rapidly changing competitive environment that may favor certain forms of plan organization or health care delivery structures over others. The shift in plan start-ups and growth from staff and group models, which dominated the industry in its developmental years, to networks and IPAs during more recent years suggests that such changes are, in fact, well underway.

Examination of expected PPS effects on plans and local market areas suggests that the PPS is likely to exacerbate behavioral changes in the HMO industry, especially so in market areas where the PPS has introduced substantial pressure on hospitals to reduce length of stay and to more efficiently use services. In areas with a high degree of competition in their hospital markets, HMOs are likely to more aggressively adopt new modes of operation and patient care delivery.

The responses adopted by HMOs are likely to vary, but are expected to occur in one or both of the primary ways by which the plans can achieve comparative advantage: (1) utilization control and managed patient care, and (2) negotiations with hospitals and other providers for discounted rates. Changes in HMO industry behavior relating to pricing decision, product output, administrative structures and operating policies, whether any of these changes can be attributed to the PPS, and the implications of these changes for the comparative advantage of HMOs and other managed care, fixed capitation systems under the PPS are explored in this section.

7.1 Hospital Benefits and Pricing Arrangements

Reductions in hospital lengths of stay, whether they are due to the PPS or to factors unrelated to the new system, are the most direct, measurable way that changes

in hospital behavior are likely to affect the comparative advantage of AHPs. Figure 7.1 compares rates of hospital utilization in the fee-for-service sector and in HMOs over the period 1980 to 1985, aggregated from the state to the national level (states not served by HMOs have been excluded from the analysis).[1] Fee-for-service utilization has dropped from 1,343 hospital days per 1,000 population to 1,234 days while HMO utilization has remained fairly stable around 417 days per 1,000 members. It is important to monitor this trend in future years as an indicator of PPS effect (across areas) on AHP comparative advantage and availability. It is important to carefully monitor any changes that may occur in the area of beneficiary access to health services, and the quality of care whether in AHPs or in the fee-for-service sector. The rapidity of changes in physician practice patterns and the forms in which competition takes place in the hospital sector draws attention to the importance of on-going monitoring, as transitionary periods such as this are vulnerable to the learning process.

HMOs account for a growing percentage of hospital days nationwide, more than doubling their share from 1.4% of total days in 1980 to 3.2% in 1985.[2] Whether comparative advantage has declined due to length of stay reductions, or has increased due to the purchase of greater numbers of days is unclear. The PPS effects on HMOs may vary across areas, depending on the degree of competition in an area, the numbers and sizes of HMOs and their affiliation with networks or chains to facilitate block

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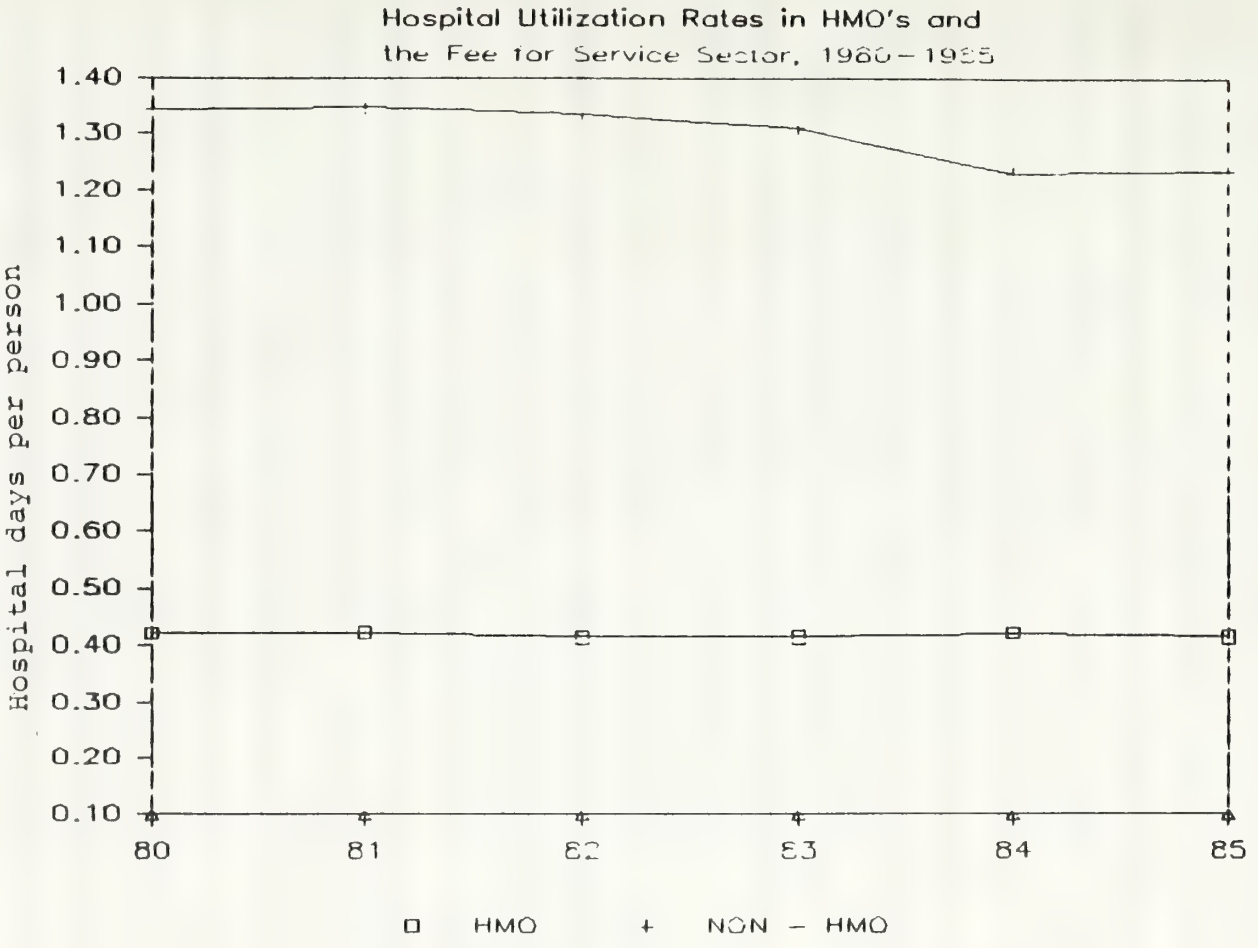
[1]HMO utilization was calculated from Interstudy National HMO Census data. Patient days per 1,000 HMO members were availale for about one-third of HMOs. State-level utilization rates for HMOs were based on the ratio of total patient days for HMO members in the plans reporting these figures divided by the number of HMO members in this same subset of plans. State utilization rates were then aggregated to the national level. National patient days and population values (HMO and non-HMO) were aggregated from county data from the AAI County-Level File. Non-HMO utilization rates were calculated as (Total Patient Days-HMO Days)/(Total Population-HMO Population). States with missing values for HMO utilization in the Interstudy data in any year (11 states had one or more year like this) were not included in the national aggregates.

[2]Data reflected in Figure X. HMOs increased their use of hospital days from 3.7 million in 1980, compared with 257 million in the fee-for-service sector, in 1980 to 7.6 million days in 1985, compared with 242 million fee-for-service days.

FIGURE 7.1:



Data Source: AAI County-Level File and Provider File (see ch. 4)

purchase or volume discount arrangements, local occupancy rates and the nature and extent of competition in hospital insurance markets, including the concentration of hospitals (for selective contracting), area-wide gains or losses experienced by hospitals under the PPS, and the variability of PPS effect on hospitals within areas.

The case studies indicate that HMO comparative advantage through hospital benefit efficiencies can occur through various means, effecting different changes across plans and market areas. Most HMOs did not use DRGs in negotiations for hospital care, consistent with national trends. Only one plan, in Waterloo, used DRG payment; most HMO administrators claimed that DRGs were inefficient and generous. However, the effect of reductions in length of stay on HMO comparative advantage was explicitly addressed only in the most developed HMO market (HMO market penetration was 20% for one plan alone). At a plan in Portland, where HMOs have been a long-established presence, length of stay reductions were explicitly attributed to the PPS, with the result that the HMO now faced stiffer competition with respect to commercial insurance plans. The "big cushion" that the HMO maintained relative to the fee-for-service sector under cost-based reimbursement was allegedly reduced under the PPS, as the state average number of inpatient days dropped from 800 days per 1,000 population to 500 days. The HMO average, which had initially been at 500 days, dropped to 400 days--but further reductions are unlikely to be medically sound. This highly competitive situation has resulted in a short-run advantage for the Blues--who had budgeted for 800 days, but with 500 days now the norm, have been able to amass great reserves.

Albuquerque is a younger market (at least 5 plans have entered this market since 1985, prior to which this market had only one HMO) with one of the highest (20-25%) HMO penetration rates in the country. There has been no apparent evidence of cost reductions in the fee-for-service sector. Most new plans are IPAs, but the dominant plan in this market is a large group model. Overbedding and rising average fixed costs in hospitals have resulted in rising charges to commercial payers; Blue Cross has

implemented its own hospital payment plan, including cost-based limits, that is consistent with PPS incentives in an attempt to stem increasing expenditures for its membership. At most of the other sites, HMO penetration was much lower, with many young plans, and reductions in hospital utilization were not immediately apparent.

Declining occupancy rates, as market competition increases, have affected HMO negotiations with hospitals. In most market areas, the pressures of declining occupancy have improved the ability of plans to obtain favorable arrangements for hospitalization. In the Portland area, where more than 50% of available beds are reportedly empty, the perception that hospitals are "hungry" has improved plan negotiations to such an extent that service-specific per diems have been established with five area hospitals, to within a $50 range. Some industry observers noted that the oversupply of physicians in this area was partly responsible for the move away from inpatient care. Some selective contracting with area hospitals, mainly for laboratory services and specialty care, also occurs with HMOs in this market area.

Local HMO markets nationwide are experiencing a wide spectrum of contracting arrangements with hospitals, placing facilities at progressively greater risk. Over a five-year period one HMO market moved from paying billed charges, to discounted charges, to per diems, to discounted per diems, and finally to a capitated rate for all inpatient care, as more and more hospital beds were freed up by the 20-25% decline in inpatient days. Discounted per diems for hospital care are negotiated by most HMOs in this and most markets. This arrangement places the hospital at risk for service intensity, while the HMO is responsible for managing length of stay.

Non-price competition was an important feature in all HMO market areas visited during the case studies. Non-price competition included full facility service at staff and group models, choice of hospitals through some group models, and choice of physician at IPAs. Networks often combined both choice of hospital and choice of physician. To employer groups, the more aggressive plans are marketing utilization

control programs such as preadmission screening and prior authorization. Developed HMO markets tend to be highly segmented, with HMOs "specializing" in the benefit and care needs of particular employer groups.

Non-price competition took on particular significance in the Pittsburgh area, where state regulation determines the premiums insurers, including HMOs, can charge. HMO premiums in this market are based on uniform community rates established for all plans by the state insurance commission. The extraordinarily high (85%) Blue Cross market share has reportedly retarded HMO development, and has significantly undermined the potential for HMO negotiations with hospitals, where state regulation limits the premiums insurers, including HMOs, can charge. In this market, HMO premiums based on uniform community rates are established for all plans by the state insurance commission. Direct contracts between HMOs and hospitals have only recently been established; most plans chose a lower risk (and higher cost) option of paying Blue Cross administrative fees to obtain the Blue Cross per-diem discount. The strong Blue Cross influence over the determination of the hospital component of HMO costs has effectively limited HMO comparative advantage and market share relative to its largest competitor.

7.2 Physician Contracting

HMOs are now negotiating a wide variety of contract arrangements with physicians, ranging from salaried positions in staff model plans to full or partial capitation arrangements and rates by fee-for-service schedule in IPA and network models. The trend among newer plan types, especially in highly competitive, growing HMO markets, is to place practitioners at greater risk for patient care management, often to the extreme of holding individual physicians responsible for the costs of specialty care and hospitalization within the limits of capitation.

At one of the larger, nationally affiliated IPA plans two types of capitation payments are negotiated with physicians and physician groups. Plan physicians, most of

whom hold exclusive contracts with the IPA, may contract for either primary care capitation or more commonly, for full capitation payment, without a hold-back reserve account.[1] Full capitation arrangements have presumably been preferred with clinics and multi-specialty groups under contract to this HMO. Bonus payments are offered if hospital utilization is down.

One of this plan's competitors, operating like a modified PPO, uses a fee schedule and 20% withholding. Another local IPA uses a fee schedule for physicians, subject to a fee maximum set at 90% of usual and customary charges and collective withholding for participating physicians. Further reductions are being considered, spurred by competitive pressures from other health plans.

The terms and incentives of provider risk arrangements in HMOs are the subject of growing concern. Physician referrals to hospitals or specialists are perceived to be closely associated with the degree of risk providers are required to assume under capitation contracting arrangements. Most plan administrators are sensitive to this dynamic, and the potential that capitation incentives may create for underutilization of services. In southern Florida, one of the area's largest Medicare HMOs received particularly heavy criticism for its subcontractor arrangements, which place physicians at full risk for total patient care. Some claim that physician contractors to this HMO have restricted member access to needed services.

Increasing market competition is most frequently cited as a reason for the widespread growth in physician contracting with plans. A plan administrator in Portland indicated that, because about 75% of the physicians in the area feel their incomes will be

[1] A hold back reserve account is a common risk-sharing arrangement in which a portion of a physician's payment is retained by the plan as an incentive for controlling utilization and insuring against excessive costs of care.

reduced under the PPS, physician interest has increased. Physician practices were carefully monitored at most plans in Portland.

In the Pittsburgh area, HMOs are just now entering into price negotiations with physicians. Because Blue Cross/Blue Shield has monopsony power in this market, some HMOs have not been able to obtain contracts with providers below the Blues' usual and customary charges, although this trend is now changing. Currently, one plan pays physicians on a per-capita basis, with 20% withheld until year end and contingent upon "appropriate" utilization. Another plan put their group practices at risk (20% withheld) for specialty, ancillary, and hospital services--clearly having the best control over utilization and costs of any plan visited at this site. Because of its outlying location, physicians affiliated with this HMO were forced to accept prices assigned by the HMO (usually discounted charges). The third plan salaried their primary physicians at the health centers and paid them bonuses for low utilization at the end of the year.[1] In the IPA arm of the plan, physicians were paid a capitated rate, with income retained and paid back if utilization is low. Apparently some of the plans had looser arrangements with primary care physicians until liability insurance rates forced plans to secure contracts with their physicians. In an attempt to secure high physician participation, the Medical Society IPA will pay physicians for each service provided based on a survey of local physician charges. They are emphasizing the lack of capitated rates in their marketing to physicians.

Large IPAs that do not carefully select providers are frequent casualties of competition in local health care markets. Established by private practitioners and hospitals in response to local HMO competition, these plans are among the least efficient of the HMO types. Typically, they lack access to necessary capital, and include "independent" physicians struggling to maintain autonomy over their patient care and practice styles. Consequently, it is difficult to control plan utilization. Accounts of plan

[1]Such bonuses were encountered routinely across sites.

failures, usually because the IPA did not select or control physician practice patterns, were told at several sites. Often, such plans are organized by providers "marketing" their greater choice of providers, on-going fee-for-service care, and are formed by independent practitioners who may resist "HMO medicine" and perceive a loss of autonomy over physician-patient relationships and treatment choices in more tightly controlled HMO model types.

7.3 Benefit Structure

HMO benefit options have been repackaged as a strategy to achieve comparative advantage within and across health care markets. Responding to growing competition from other health insurance products, HMOs have increased copayments and restrictions to preferred providers, and are likely to impose greater limitations on consumer choice and access to health care delivery options within established networks. The influx of regional and national plans, created through merger, acquisition or affiliation of established plans, has also influenced the HMO benefit structure. At a nationally recognized HMO visited during the case studies, plan executives noted that, precisely in response to competitive pressures for lower-option, lower-cost offerings through regional and national networks, their plan has not been able to expand several of its community prevention and outreach programs. Whether the PPS creates pressures that may result in additional incentives for changes in HMO benefits and coverage should be observed over time, and monitored with respect to changes in quality and access to care.

A wide diversity of plan benefit options has become commonplace in AHP markets. Recent tendencies not to seek federal qualification but to provide tailored benefit packages for experience-rated groups has encouraged even greater variation in plan benefit offerings. In established markets served by many plans, this diversity has generated confusion for consumers and for the industry itself about what an HMO is, and what benefits can be expected.

Most HMO benefit packages have been tailored to the needs of employer groups, with some regional and national chains "specializing" in this sort of plan. Chains are increasingly being used by major employer groups that have multiple locations. One nationally affiliated plan provides 35 different prevention and wellness programs and a health assessment program in-house or on-site at the workplace. Services include drug and alcohol programs and focus on "helping people to get well--and stay well." In keeping with the plan's corporate focus, the HMO plans to discontinue its Medicare business, focusing on benefits for the groups it feels it can best serve. "The elderly are a different population, with very different health needs. They need maintenance care--and don't get 'well' with the problems of age."

Multiple benefit offerings have been described as a significant corporate strategy by new plans sponsored solely, or as joint ventures with insurance companies. This is typical of the new benefit programs growing rapidly in Florida's "bellwether" markets. Most of Tampa's HMOs currently offer or are planning to offer at least PPO and/or indemnity plans in addition to the HMO benefit. Insurance-based plans, in particular, are likely to offer such triple-benefit options, often including the same providers under different contracting arrangements.

A newly emergent strategy that is growing among insurance-sponsored plans is to include HMOs as part of a "one-stop insurance" benefit for employer groups. A broad range of coverage, from auto to life to health care, may be available under such programs. Existing contracts with major employers for non-health benefits facilitates expansion into health care benefit products and, alternatively, permits health plans to expand their benefit offerings to include other insurance products. In most cases, these packages are planned only for areas served by major employer groups.

Although large employers often spur action to cost containment in health care, the presence of large employers in some health care markets has shielded many markets from cost-containment pressure. High option insurance coverage such as first-dollar

coverage and high benefit levels negotiated under union contract have reduced the potential for HMO program or systemwide savings. Waterloo, Iowa, provided such an example.

Waterloo is a struggling midwestern farm community where a large single employer, John Deere Company, sponsored the area's only HMO. Deere's rich benefit package (including full coverage for physician office visits, approved hospitalizations, all ancillary services, and home care) and the fact that, like most AHPs, the HMO's primary competition is indemnity insurance have resulted in unusually high access to services for its enrollees. It has also resulted in high costs. Hospitals in this area expected to receive gains under the PPS.

7.4 PPS Effects and HMO Administrative Practices

PPS impacts on HMO behavior have occurred primarily in the areas of plan administration and operation, as spillover effects of the Medicare program. These changes have occurred in areas related to hospital use and in documentation necessary for utilization review and quality assurance monitoring, both in-plan and by the PRO. The attribution of these changes to the PPS was stated succinctly by an HMO executive director interviewed for the case studies, who claimed that the most obvious impact of the PPS had been to generate among hospitals an awareness of the cost of health care delivery: "the government started the process, the private insurers finished the job--we hit (hospitals) at the bottom line."

Most plans are gaining tighter management control using information on costs and utilization. Some plans were in the beginning stages of monitoring and understanding physician practice patterns, referral patterns, and length of stay; others, typically "aggressive newcomers" or the "established performers," have well developed controls in

place. As noted earlier, HMOs do not tend to use DRGs in their management decision-making, and most plans considered them to be inefficient.

Management capability of HMO administrators varies. Many managers have a limited substantive knowledge of health care delivery and delivery systems; the management focus in many new plans is not always sensitive to issues beyond the realm of business. While there are several extremely qualified individuals who serve as HMO managers, the recent flurry of interest in networking arrangements in health care has permitted "fast track" career advancement, often to levels beyond individual ability. More and more people are networking in health care--but few can effectively deliver. This has been a particular problem for plans managed by outside firms, who may or may not be sensitive to local interests, and for HMO members in plans that are unsuccessful or close.

7.5 Utilization Control and Patient Care Management

The most unambiguous area of PPS impact on HMO behavior has been the increased emphasis on utilization review and patient record documentation. Not only do these requirements apply to care received by Medicare beneficiaries, but they appear to have been widely adopted by plans that do not serve the Medicare population, to remain competitive with other AHPs and with the fee-for-service sector. In some market areas there are clear indications that the PPS has affected local practice patterns, especially in the area of hospitalization.

Utilization control and patient care management have traditionally provided important mechanisms through which AHPs have been able to achieve comparative advantage over fee-for-service insurance plans. Patient record documentation required by PROs for review under the PPS plays an increasingly important role in facilitizing utilization review activities. While HMOs, in particular staff and group models, have

typically focused particular attention to these areas, most plans have stepped up their efforts to meet the increasing efficiency and control of their fee-for-service competitors.

At one large group model in Albuquerque administrators admitted that, with increasing financial pressures from the PPS plus other HMO competition, the plan is having to improve its utilization review function and rely less on intrinsic financial incentives. Other HMOs that managed care through primary care gatekeepers have begun rapidly supplementing the weak financial incentives to control utilization. These plans have started to use sanctions, prior authorization, and limit the number of specialist visits per period. Improved documentation has also been used for administrative control and quality assurance activities. Throughout most sites, HMOs acknowledged the important role of the PPS in generating this spillover to all patients, not just Medicare beneficiaries.

Utilization control in HMOs varies tremendously. Many plans had formal utilization review programs including concurrent review and coordination with staff at contracting hospitals. PPS effects on HMO utilization review have resulted in even more stringent plan monitoring and review to meet rather dramatic practice changes, including reductions in lengths of stay and shifts to outpatient use in the fee-for-service sector.

At some plans, utilization review programs have reached new levels of approach and sophistication. One regionally affiliated IPA advertises its "Certified Hospital Admission Program (CHAP) which applies "the same methodical controls and information systems that American businesses have used for years" in its marketing to employers. CHAP involves concurrent review of medical records and prior approval for all admissions by the plan. Physicians are monitored closely, by profiles of admissions and practice patterns as well as financial cost profiles, which are reviewed by the plan's

medical director. Those physicians with unacceptable profiles are subject to a six-month probation period. The HMO may also elect to charge a physician's withholding account, established for capitation payment.

In this same market area, two plans actively monitor utilization outside of the hospital setting, and a third is investigating a quality assurance plan for outpatient use. Monitoring care across providers is facilitated by the maintenance of one chart for each patient and automated patient records, which are accessible to all practitioners in a large group plan. Protocols, which guide care across providers and settings of care, are being developed by some of the large plans and chains. One such plan is examining criteria for treatment and screens that can be applied to the 20 most frequent hospitalizations.

Most HMO markets are not so aggressive or developed as the market described above. Plan sponsorship seems to be highly related to HMO approaches to utilization review, monitoring and control. Chain HMOs are leaning toward standardized treatment protocols and stringent monitoring of physicians and hospitals. Physician-sponsored IPAs usually are formed of practitioners who have resisted the HMO style of practice for greater independence and autonomy. Considerable flexibility is allowed in physician treatment, but often at the expense of plan financial viability. There is no uniform utilization review or quality assurance activity or reporting for HMOs and other AHPs.

7.6 Medicare Enrollment and Contracting

Senior plan membership in HMOs can occur in several ways: under Medicare risk contract, on a cost basis, or through membership in a supplemental benefit or retiree wrap-around plan. Plans have only recently moved into risk contracts under TEFRA regulations implemented in April 1985.

It is interesting to note that Kaiser HMOs are referred to widely throughout the industry as the only plan with the experience, gained through participation in early demonstrations, necessary to efficiently manage the health care needs and costs of

Medicare beneficiaries. Most plan directors are stymied. The assumption among industry observers is that minimum enrollments of 15,000 beneficiaries--levels of enrollment sustained by only Kaiser and International Medical Centers, a predominantly Medicare HMO of 150,000 members--are necessary to be "successful" with Medicare populations. Neither of these plans can be considered representative of the HMO industry.

It is not uncommon to see plans with enrollments of 1,000-2,000 Medicare members, proceeding cautiously. Several HMOs have set enrollment limits until more experience is gained with senior care. Plans want to be "on board" if HCFA is serious about moving forward with Medicare capitation, for a variety of reasons. Locally-based plans were eager to implement senior programs, often as a commitment to continuity of care for patients who have "aged in" to the plan. Other plans view Medicare as a potentially lucrative market, especially in areas where HMOs maintain substantial market share.

Medicare contracting has been dismissed entirely in some areas, and many areas not served by plans are not likely to be. Just as plans were in a developmental phase in the 1970s, they face a new developmental curve with senior populations.

7.7 AAPCC and Availability of HMO Options to Medicare Beneficiaries

The adequacy of the AAPCC as the basis for Medicare HMO rates, projections of future trends in the AAPCC, and changes in HCFA payment approaches were important topics to all plans. The fact that plans that have entered into Medicare risk or other contracts are overwhelmingly represented in counties with higher AAPCC rates is central to discussions about location bias due to selective marketing and enrollment across and within a plan's service area.

One executive referred explicitly to within-plan area bias and problems with the county-specific service areas as the basis for AAPCC calculations. Since plans often service several counties, HMOs are encouraged to select only certain counties for their

marketing efforts, and not others. At another HMO, the plan director also noted that these large disparities across counties encourage selective marketing: "There's great variation in the AAPCC within a plan's market area, but the same price must be charged."

At the market level, plans heavily base Medicare contracting decisions on the AAPCC rate. Plans differ greatly in their willingness, across market areas, to participate with the Medicare program. Albuquerque and Tampa provide interesting examples. At least four Albuquerque HMOs enroll Medicare beneficiaries on an at-risk basis. According to one plan, roughly 20% of all Medicare eligibles were in such arrangements, giving Albuquerque one of the highest at-risk penetration rates in the country. The large HMO has been familiar with capitation in Albuquerque for several years and with this experience felt quite comfortable with the AAPCC rate concept and with the fee-for-service sector. Other plans have gone through a financially painful learning process with some large losses from hospital overutilization. A few have temporarily closed their at-risk enrollment while negotiating capitated rates with hospitals in order to shift the utilization risk of these high-cost enrollees. The hospital portion of the AAPCC has been used as the actuarial benchmarks in these negotiations.

The Tampa area has a high concentration of seniors, but HMOs have limited or have discontinued their participation with Medicare. A general lack of interest in senior markets can be attributed to the plans' employer focus; lack of provider interest in Medicare contracting can be attributed to perceptions about the AAPCC. Tampa's AAPCC rates are notably lower than those in Miami, although according to some plans, Tampa patient care costs through HMOs do not necessarily reflect this. Plan average community rates (ACR), based on costs of non-Medicare enrollees, are also high relative to the Medicare AAPCC, offering little additional margin for senior members. Rumor has it in the industry that "the AAPCC must be four times a plan's average community rate (ACR) in order to survive under risk-based capitation." Providers were critical that

neither marketing nor administrative costs are included in Medicare rates and that the program does not reflect true physician charges, averaging "30-40 cents on the dollar" for local plans. Many of the area's new plans have focused their marketing on employer groups, including many Fortune 500 companies that are reportedly expanding or starting operations in the Florida boom.

In Tampa, only one plan of four visited on site maintained a contract with the Medicare program, on a cost basis, and this was terminated by the plan January 1, 1987. At its peak, this staff model served more than 6,000 beneficiaries. Enrollment in December 1986 included 2,500 Medicare members. High hospitalization rates for this group, which includes 41 dialysis patients, have placed severe financial pressure on the plan. This experience is a major factor in the decision to discontinue participation with Medicare. Until two years ago, this HMO had offered a high option supplement plan to beneficiaries, including a full hospitalization benefit, which has subsequently been trimmed to maintain premiums at competitive levels. The plan's hospitalization experience with Medicare enrollees has been 2,800 hospital days per thousand, above the expected average of 2,000 Medicare days.

These factors have discouraged HMO involvement locally with Medicare, especially under risk-based contracts. This reticence was summarized by an executive at a large IPA, who notes, "if our plan experience exceeds cost with employer groups, we can request renegotiation of the rate and obtain an appropriate increase. If this happens with Medicare, we're stuck. Why should we subsidize the government with this sort of risk to the plan?" All plan administrators in fact agreed that contracting arrangements required alternative rate approaches to encourage enrollment of Medicare beneficiaries.

7.8 Marketing to Medicare Beneficiaries

Benefit programs for Medicare beneficiaries are often administered as separate plans under the larger umbrella of the parent HMO. One reason for this separation of plans is the different emphasis placed on marketing to employer groups and to Medicare

beneficiaries. Marketing HMO membership to employer groups is directed first to the employer, and then to employees as a benefit selection through the workplace. Marketing to Medicare beneficiaries poses a greater challenge, since most seniors are not in the workforce. Marketing to seniors in less densely populated areas places even greater need for ingenuity on the part of senior plan marketers.

Numerous approaches have been attempted, some of which have resulted in media scandal. In Florida, seniors have been recruited in shopping centers and at dances. A Portland plan offers a coffee hour at local hospitals, to which Medicare beneficiaries are invited by friends--by word of mouth.

Age-in groups are a growing market segment, especially for older plans as employer group members retire from the workplace. The industry overall remains ambivalent. In Pittsburgh, the over-65 population is considered to be a "high risk" and some HMOs will not enroll over-65 age-in members for six months, while utilization profiles for the entire group are developed. Other plans in different markets are rolling forward, but are no better informed on the cost and utilization experience of senior members.

8.0 The PPS and the Role of AHPs in the Medicare Program

The availability of AHPs for Medicare beneficiaries usually depends both on whether the plan serves the area where beneficiaries reside, and whether the plan views Medicare contracting favorably. That is, whether plans see the potential for comparative advantage over the Medicare fee-for-service system in enrolling seniors. The PPS impact on HMO participation with Medicare, in areas where plans are available to non-Medicare beneficiaries, is directly observable through examination of PPS effects on the AAPCC, as the basis of payment for enrollees in the Medicare program. The effects of the PPS on plan participation with the Medicare program are examined to explore whether the PPS is likely to favor or discourage plan participation in TEFRA risk or other contracts with Medicare, and whether PPS effects on plan participation are more frequent in particular types of local markets.

Because Medicare risk contracting has been in large part a response to 1985 changes in contracting regulations, PPS effects may be difficult to discern from secondary data sources at this early stage of the program. Measures of the expected PPS impact at the county market level may nevertheless provide insight into current and future contracting trends. These issues, along with descriptive trends and related operational and administrative concerns expressed by plan executives during case study site visits, are examined in this section.

8.1 HMO Contracting with Medicare

HMO participation in the Medicare program continues to be a widely debated issue by industry representatives and the federal government. Among the concerns most frequently voiced in industry circles are the willingness of plans to enter into TEFRA risk contracts under the terms of the April 1985 revisions to HCFA regulations, the adequacy of payment rates based on the AAPCC, and the potential risk due to adverse selection to plans that contract to serve Medicare's elder population.

The enrollment of public beneficiaries in fixed capitation plans has been a long-established interest of the federal government. HCFA has supported the enrollment of public beneficiaries in AHPs through the Medicare program under Section 1876 of the Social Security Act as early as 1972, when the HMO industry was in its early developmental stages. Medicare involvement with beneficiary enrollment in AHPs was not actively pursued until recently, however, with federal attention directed to cost containment in the hospital sector throughout most of the 1970s.

Under Section 1876, HMOs were allowed the option of enrolling Medicare beneficiaries under cost- or risk-based contracts. Plan participation was limited. Most plan contracts with Medicare were cost-based, providing payment for services used in a manner similar to fee-for-service health care delivery. Cost-based contracts eliminated any risk to plans for the utilization experience of Medicare beneficiaries, about which little was known. Cost-based contracts, however, lacked the incentives of the prospective, risk-based capitation that most plans applied to their non-Medicare members. The incentives of the risk contracts under Section 1876 allowed AHPs to retain profits if their patient care costs fell below established premium rates, but held plans at risk for the costs of care above premium levels. Industry representatives maintained that Section 1876 provisions restricted the amount of profit that plans could retain while serving Medicare members while holding the HMO at risk for all losses, and charged that Medicare's reimbursement and reporting requirements were both excessive and burdensome.

In 1978 and in 1982, HCFA supported demonstration projects for HMOs under risk-based contracts. Eight HMOs were selected to participate in the Medicare Capitation Demonstrations (MCD) in 1978. A total of 52 plans, including two of the original MCD plans which agreed to participate, were selected for the National Medicare Competition demonstrations (NMC) in 1982. The experience gained from these

demonstrations was used to help refine the risk contracting process, and to encourage plan participation with HCFA under such arrangements.

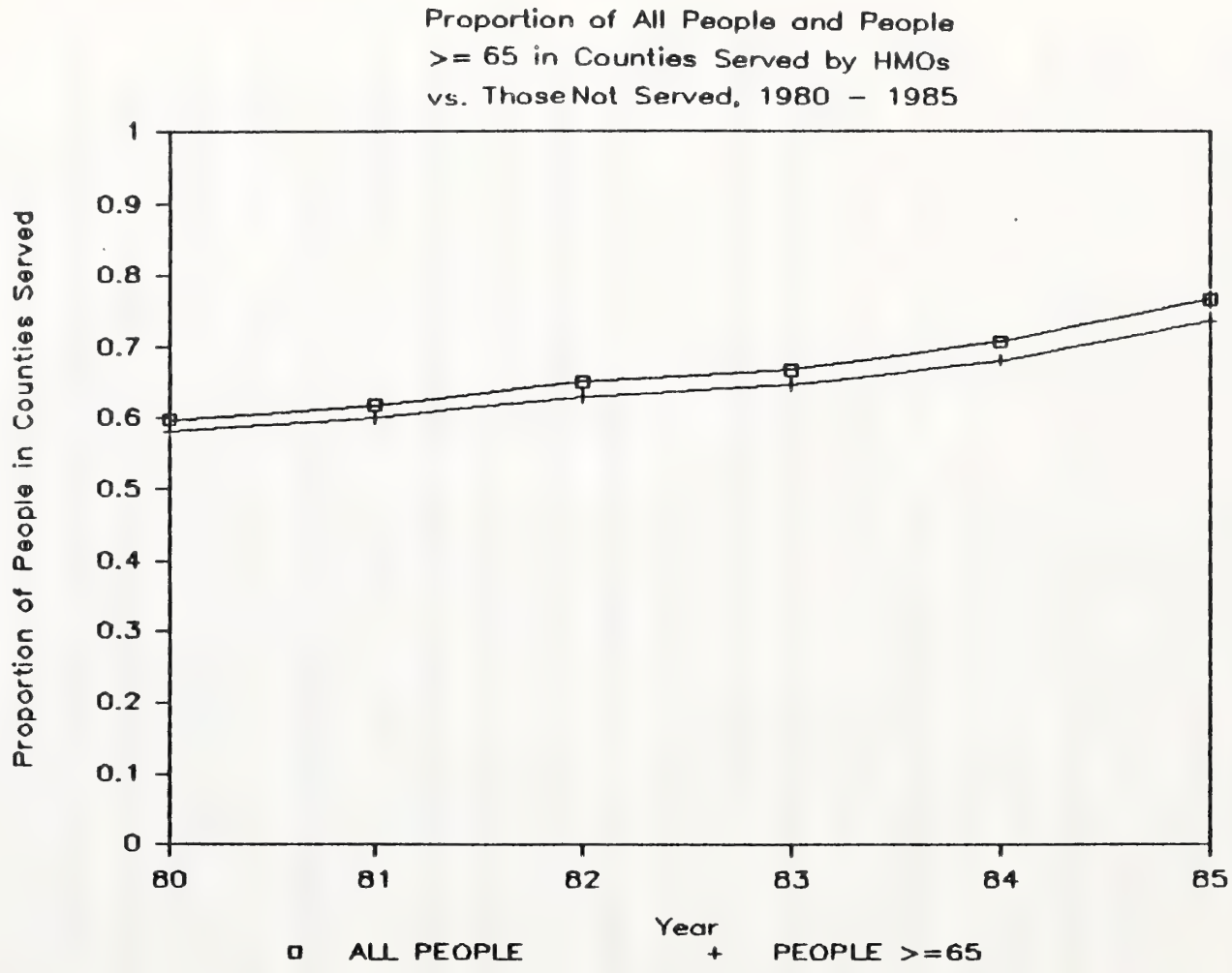
Legislative regulations governing Medicare AHP contracting and enrollment were revised for non-demonstration plans under TEFRA in 1982, but were not implemented until April 1985. Under the new system, reimbursement for cost-based contracts was capped at the weighted Average Adjusted Per Capita Cost (AAPCC) in the fee-for-service sector for the plan's Medicare members under TEFRA. The terms on which HCFA would agree to a risk-based contract were altered to encourage AHP participation. The following section describes findings relating to 1985 plan participation with the Medicare program.

8.2 Plan Participation by Model and Contract Type

Potential availability of HMOs to Medicare beneficiaries can be approximated by looking at the number of people 65 years old or older who live in counties served by an HMO. Table 8.2.1 shows that the proportion of people 65 or older in counties served has increased from 58% to 73% between 1980 and 1985. This rate of increase closely parallels that for the population as a whole, suggesting that federal and private efforts to encourage HMOs to enroll Medicare beneficiaries have been successful, but that this group is still not aggressively sought after industrywide. Still, interpretation of these proportions as measures of availability should be viewed judiciously: because an HMO reports a county in its service area does not necessarily mean that it has any significant Medicare (or employee) membership there or that it actively recruits or even enrolls Medicare beneficiaries.

Across all plans, numbers of Medicare HMO enrollees have increased from 379,770 in 1980 to 861,807 in 1985, at rates equivalent to those reported for employee groups (Table 8.2.2). Medicare enrollment as a percentage of total plan enrollment has not increased substantially over this period. However, in the year 1981, overall Medicare beneficiary enrollment under any contract across all plan types was the highest reported

FIGURE 8.2.1



Data Source: AAI County-Level File (see ch. 4)

TABLE 8.2.2: HMO MEDICARE ENROLLMENT BY PLAN TYPE BY YEAR

PLAN TYPE		YEAR					
		1980	1981	1982	1983	1984	1985
STAFF	% Plans[1]	53	57	48	53	62	46
	% Enrollment[2]	2.9	3.7	4.0	4.1	4.2	4.0
	Enrollment[3]	47,755	41,871	62,610	85,827	88,032	117,893
GROUP	% Plans[1]	30	51	29	29	32	27
	% Enrollment[2]	5.6	6.0	4.3	4.6	4.5	5.2
	Enrollment[3]	314,749	394,314	254,296	282,089	293,097	326,212
NETWORK	% Plans[1]	0	35	20	21	31	42
	% Enrollment[2]	0	0.6	4.9	4.5	6.6	6.9
	Enrollment[3]	0	4,813	86,202	94,908	229,917	312,008
IPA	% Plans[1]	18	24	13	16	18	28
	% Enrollment[2]	1.0	2.2	1.3	1.0	1.7	1.9
	Enrollment[3]	17,266	34,329	18,650	19,012	48,738	105,694
ALL PLANS	% Plans[1]	31	41	26	29	31	33
	% Enrollment[2]	4.3	4.7	4.0	3.9	4.4	4.5
	Enrollment[3]	379,770	475,327	421,758	481,836	659,784	861,807

[1]With Medicare beneficiaries out of all plans in this category
[2]Percent Medicare enrollment of total enrollment
[3]Total Medicare enrollment.

for the 1980-1985 period (4.7% of all enrollees) and the year in which the highest percentage of plans (97 of 239 or 41%) served Medicare members. In 1985, networks reported the largest proportion of Medicare beneficiaries (6.9% of total network enrollment), followed by group plans (5.2%) and staff models (4.0%). IPAs reported the smallest overall proportion of Medicare enrollment (1.9%).

HMO participation with Medicare under any contract status varies by plan type, with staff models participating in proportionately larger numbers, across all years (mean, 53%), followed by group models and networks (33% and 32%, respectively), while only 21% of IPAs enrolled Medicare beneficiaries under a variety of arrangements. In 1985, however, staff models and networks both had a high participation rate (46% and 42%, respectively), while IPAs had increased to 28% and group plans had dropped to 27%. Although some plans serving Medicare beneficiaries chose risk contracts (under the revised regulations for non-demonstration sites implemented in April 1985), in 1985 staff and group models had the lowest proportion of plans with Medicare beneficiaries of all years since 1980. Networks and IPAs had the highest proportions since 1980.

Of plans that serve Medicare beneficiaries, networks and groups are more likely to do so on a risk basis (14 of 36 plans, or 39%, and 8 of 21 plans, or 38%, respectively) than IPAs and staff models, which report 17 of 69 plans (25%) and 6 of 29 plans (21%), respectively, under risk contracts (Table 8.2.3).[1] IPAs represent the largest number of plans with risk contracts (17 of 45, or 38% of all risk contracts), but only 14.5 percent of Medicare beneficiaries enrolled on a risk basis are in these plans. Networks represent a large number of plans with risk contracts (14 of 45, or 31%) and account for 62% of Medicare risk contract membership (including substantial enrollment at IMC, the nation's

[1] 87 plans reportedly held risk contracts with HCFA as of December 1985. Several of these risk-based plans are affiliated, and are reported as one plan in the National HMO Census. These multiple-plan locations are counted as one plan for analysis, resulting in 74 plans with risk contracts. Because many plans with risk contracts have not yet enrolled Medicare beneficiaries, these plans were excluded from analysis. A total of 45 plans have been included.

TABLE 8.2.3: HMOs WITH MEDICARE BENEFICIARIES BY TYPE OF CONTRACT WITH HCFA, 1985

PLAN TYPE		TYPE OF CONTRACT: RISK	TYPE OF CONTRACT: NON-RISK
STAFF	NUMBER OF PLANS	6	23
	MEDICARE ENROLLMENT	19,355	98,538
	MEAN ENROLLMENT	3,226	4,284
GROUP	NUMBER OF PLANS	8	13
	MEDICARE ENROLLMENT	63,430	262,782
	MEAN ENROLLMENT	7,929	20,214
NETWORK	NUMBER OF PLANS	14	22
	MEDICARE ENROLLMENT	215,705	96,303
	MEAN ENROLLMENT	15,408	4,377
IPA	NUMBER OF PLANS	17	52
	MEDICARE ENROLLMENT	50,815	54,879
	MEAN ENROLLMENT	2,989	1,055
ALL PLANS	NUMBER OF PLANS	45	110
	MEDICARE ENROLLMENT	349,305	512,502
	MEAN ENROLLMENT	7,762	4,659

largest Medicare HMO in south Florida). Group plans represent 18% of plans with risk contracts, and serve 18.2% of Medicare beneficiaries in risk contracts. Staff models, which account for 13% of risk-based plans, serve only 5.5% of beneficiaries under risk contracts.

Networks and IPA's have more enrollees per plan in risk contracts than staff and group models, which report more Medicare beneficiaries per plan in non-risk contracts than under risk contracts. Networks have only 4,400 Medicare members per non-risk contract compared to 15,400 for risk contracts. (Network averages are likely to reflect large averages for IMC, the nation's largest Medicare risk HMO.)

8.3 HMO Availability and Participation in the Medicare Program

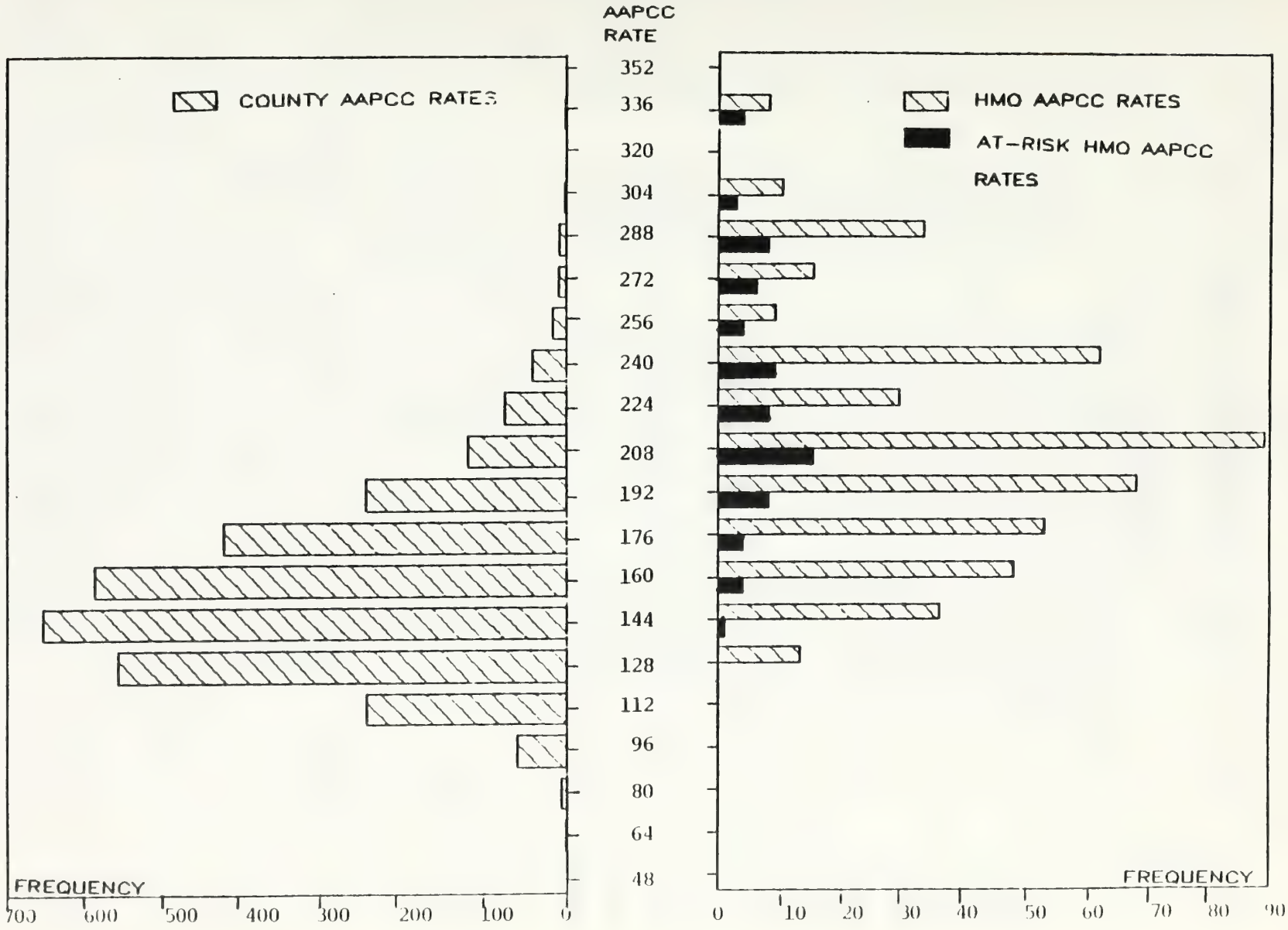
HMO participation in the Medicare program depends on the availability of HMOs to group members and HMO perceptions about the comparative advantage or profitability of enrolling Medicare members in the plan. Participation is related to the level of payment per beneficiary, based on the Medicare AAPCC in the fee-for-service sector at the county level, with adjustment for beneficiary age and welfare status.

HMOs, whether or not they participate in the Medicare program, tend to be distributed in higher cost areas: counties where the AAPCC, which represents the average Medicare expenditure per beneficiary for Part A and Part B services, is higher than the average (Figure 8.3.1). In 1985, 80% of plans were located in counties with the top one-third of AAPCC rates, 16% were in middle AAPCC areas, and only 4% were located in counties in the lowest third of the countywide AAPCC distribution. HMOs with risk contracts tend to be in counties with higher AAPCC rates on average than HMOs overall; 93% are located in counties with the top one-third AAPCC rates.

Counties were classified as high, medium or low AAPCC rate areas and were examined using descriptive and multivariate analyses (Table 8.3.2). Counties with high AAPCC rates were significantly distinguished from middle AAPCC and low AAPCC counties using discriminant analysis, by their tendency to have a lower percentage of

FIGURE 8.3.1:

Distribution of Counties and HMO's
by AAPCC Rates, 1985



Data Source: Interstudy National HMO Census, AAI County-Level File (see ch. 4), and HCFA Office of Prepaid Health Care

TABLE 8.3.2: MARKET CHARACTERISTICS OF AREAS WITH HIGH, MEDIUM, AND LOW AAPCC RATES, 1985

	CLASS MEANS				
	HIGH AAPCC	MED AAPCC	LOW AAPCC	F	PROB>F*
BIRTH	1530.67	1504.36	1507.61	2.11	0.12
POPDENS	523.23	80.23	58.10	20.31	0.00
P65GT	0.12	0.14	0.14	47.74	0.00
SMSA	0.40	0.22	0.11	110.02	0.00
CAPINC	10.69	9.59	8.62	249.89	0.00
CPIPCT	3.41	3.36	3.25	31.78	0.00
EMPLARG	0.00	0.00	0.00	3.38	0.03
HERFINDX	0.16	0.19	0.18	13.04	0.00
PHYSPOP	114.97	85.71	73.35	55.27	0.00
NHB	999.01	368.53	261.74	67.31	0.00
HMOPOP	3.86	1.79	0.69	83.89	0.00
GAINLR_V	0.03	0.02	0.02	33.10	0.00
STGHU_AV	0.64	0.61	0.60	13.31	0.00
GAINLR_C	0.00	0.03	0.06	49.82	0.00

*ONE-WAY ANOVA

TABLE 8.3.2 (continued)

RAW CANONICAL COEFFICIENTS

	CAN1	CAN2
BIRTH	0.00	-0.00
POPDENS	0.00	-0.00
P65GT	-3.08	5.23
SMSA	0.83	-0.49
CAPINC	0.33	0.22
CPIPCT	0.32	1.14
EMPLARG	-189.14	-67.69
HERFINDX	-1.47	3.88
PHYSPOP	0.00	-0.00
NHB	0.00	-0.00
HMOPOP	0.01	0.00
GAINLR_V	0.68	9.59
STGHU_AV	-0.77	-0.05
GAINLR_C	-3.37	-1.09

CLASS MEANS ON CANONICAL VARIABLES

HIGH AAPCC	0.68	-0.08
MED AAPCC	-0.09	0.20
LOW AAPCC	-0.66	-0.12

	CAN CORR	ADJ CORR	SE	F	DF	PROB>F
CAN1	0.48	0.48	0.02	27.55	28	0.00
CAN2	0.14	0.12	0.02	3.71	13	0.00

Data Source: AAI County-Level File (see Chapter 4)

elderly residents, their urban location, higher per-capita incomes and greater inflationary increases. High AAPCC counties also tended to show greater variation in PPS impact across hospitals countywide. Middle and low AAPCC counties, by contrast, were more likely to have more large employers, but were located in less competitive hospital markets with higher short-term hospital utilization rates. The PPS is expected to effect greater variability across hospitals in counties with higher AAPCC rates, but fewer aggregate gains at the county level. Whether these expected PPS effects result in changes in the continued attractiveness of high AAPCC areas over time is an important concern to the further expansion of capitation initiatives for Medicare beneficiaries in these areas.

Interesting findings relate to the presence of large employer groups in local health care markets. Large employers did not tend to be located in areas with the highest AAPCC rates, but were nevertheless likely to be located where short-term general hospital utilization is higher than in high AAPCC areas. The apparent lack of success of large employers, which frequently offer generous first-dollar insurance coverage through unions or trade organizations, in controlling hospital costs is an important consideration for efforts to include retirees in Medicare capitation programs. The PPS by itself is unlikely to exert sufficient competitive pressure on hospitals to control utilization and cost, since these incentives are buffered in areas (like Waterloo) that are likely to experience gains. The majority of HMOs with Medicare risk contracts do not serve these counties, presumably because of their lower AAPCC rates. Further consideration should be given to arrangements between plans and employers in determining appropriate linkages to encourage HMO availability and participation with Medicare, and payment rates for employee retirees in these areas.

8.4 Plan Participation by Contract Type and Service Area

Analysis of variance and discriminant analysis were conducted to explore whether counties served by HMOs with TEFRA risk enrollment,[1] counties that serve

Medicare beneficiaries on a non-risk-basis, and counties served by HMOs that do not enroll Medicare beneficiaries had any distinguishing characteristics which might help to explain Medicare contract participation (Table 8.4).

Univariate relationships suggested that per capita incomes and whether or not a county was located in an urban area were most significantly related to whether the county was served by a Medicare HMO under any type of arrangement. Multivariate discriminant analysis revealed that the counties served by HMOs with a cost or risk contract in 1985 were also likely to have experienced higher birth rates, lower changes in inflation, fewer large employers, more competition in hospital markets and are expected to have fewer gains under the PPS. These counties were also likely to experience greater variability in the PPS effect across hospitals, and had higher hospital occupancy rates. The AAPCC in these counties tended to be higher than in counties served by HMOs with cost contracts, or counties with HMOs not participating with Medicare. These counties also had higher HMO penetration and slightly lower physician-to-population ratios.[2]

These findings provide a context for the varied responses to Medicare contracting expressed by plan managers during case study site visits. Three of 5 HMOs in Portland actively serve Medicare members: the relatively high market share and increasing competitive pressures make Medicare a desirable new market for plans. The Albuquerque HMO market also actively serves Medicare members in several plans under risk contracts. The AAPCC in these areas is considered to be generous.

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[1]In this case all HMOs with risk contracts were included regardless of whether they actually had Medicare beneficiaries enrolled.

[2]A second significant combination of market features, once these have been accounted for, also distinguish HMO markets that serve and do not serve Medicare (CAN2). This second set of characteristics, while they provide statistically significant classification, are trivial predictors, as indicated by the relatively low (.19) canonical correlation with group membership.

TABLE 8.4: MARKET CHARACTERISTICS OF AREAS WITH NO HM MEDICARE HMOs, AND WITH AT-RISK HMOs, 1985

	CLASS MEANS				
	AT-RISK HMO	MEDICARE HMO	NO MCARE	F	PROB>F*
BIRTH	1548.93	1474.07	1506.00	5.00	0.01
POPDENS	968.26	521.22	233.15	6.60	0.00
P65GT	0.12	0.12	0.12	2.75	0.06
SMSA	0.56	0.55	0.51	0.85	0.43
CAPINC	11.29	11.18	10.15	30.29	0.00
CPIPCT	3.53	3.26	3.31	25.50	0.00
EMPLARG	0.00	0.00	0.00	1.47	0.23
HERFINDX	0.14	0.18	0.17	6.10	0.00
ARRATEAB	183.19	172.80	160.14	42.73	0.00
GAINLR_C	0.02	0.02	0.05	11.88	0.00
GAINLR_V	0.04	0.04	0.03	2.28	0.10
HMOPOP	8.62	6.08	3.55	50.21	0.00
PHYSPOP	133.60	118.00	108.19	4.99	0.01
NHB	1532.70	1162.62	781.26	10.59	0.00
STGHU_AV	0.67	0.67	0.67	0.16	0.85

*ONE-WAY ANOVA

TABLE 8.4 (continued)

RAW CANONICAL COEFFICIENTS

	CAN1	CAN2
BIRTH	0.00	0.00
POPDENS	0.00	-0.00
P65GT	17.20	-0.83
SMSA	-0.30	-0.04
CAPINC	0.17	-0.28
CPIPCT	0.58	1.30
EMPLARG	-167.34	-46.43
HERFINDX	0.09	-2.54
AARATEAB	0.01	0.00
GAINLR_C	-1.20	6.31
GAINLR_V	-1.89	-4.07
HMOPOP	0.08	-0.01
PHYSPOP	-0.00	0.00
NHB	-0.00	0.00
STGHU_AV	-0.52	0.45

CLASS MEANS ON CANONICAL VARIABLES

AT-RISK HMO	0.69	0.09
MEDICARE HMO	0.04	-0.48
NO MCARE	-0.52	0.08

	CAN CORR	ADJ CORR	SE	F	DF	PROB>F
CAN1	0.48	0.47	0.03	9.93	30	0.00
CAN2	0.19	0.16	0.03	2.56	14	0.00

Data Source: AAI County-Level File (see Chapter 4)

No plans currently participate in Medicare risk contracting in Tampa, where a nationally affiliated staff model, which has enrolled over 6,000 Medicare beneficiaries at the peak of its cost contract two years ago, terminated Medicare contracting in January 1987. Major complaints included the plan's experience serving seniors, 41 of whom required dialysis treatments, and the inadequacy of the AAPCC to cover patient care costs through the plan. Tampa's AAPCC rate, $196, is significantly below the rate for the Miami area ($338), where HMOs are actively competing for enrollment at 95% of the AAPCC.

Medicare HMO members under risk contracts are more and more likely to be enrolled in a network or IPA model. The stability of these plans, many of which are new and small in size, should be followed. There is also great variation across plans with respect to benefit offerings and provider access. The risk arrangements used by these plans with hospitals, physicians and other providers increasingly include "hold backs" or other risk sharing provisions such as cash bonuses to providers who maintain low rates of hospitalization. This diversity of plan offerings can be confusing to beneficiaries facing enrollment choices in both Medicare and employer groups. Many case study respondents stressed the importance, and difficulty, of educating seniors to their health benefit coverage in HMOs as well as in the fee-for-service sector. Confusion is further exacerbated when mergers, closures or restructuring induce changes with implications for patient care service delivery.

Not all plans are equally suited to provide care for Medicare members, although many have expressed an interest in doing so. One plan, having tried serving Medicare members on a cost basis, was returning "to do what we do best -- to serve healthy people who like to jog." However, the approach of a plan in another market was more typical of most HMOs now entering into contracts with Medicare: to gradually build experience with senior members and to proceed with enrollment slowly and cautiously.

The question of whether the PPS may contribute to changes in the Medicare

contracting environment, encouraging or discouraging plan decisions to participate in the Medicare program, is a central policy concern. Monitoring of HMO activity, with routinized reporting systems similar to those of hospitals under the PPS, is needed to fully examine actual PPS impacts on AHPs over time. Plan submission of data would also permit easier comparison and assessment of performance across plans.

9.0 Competition, the PPS and Access to HMOs for Public and Private Beneficiaries: Summary and Conclusions

The prototypical HMO of the 1970s, operating in the environment of cost-based reimbursement for hospitals, was likely to be a group or staff model. Industry advocates could point to the popularity and success of large HMO plans such as Kaiser Permanente as "model" HMOs, and indeed, Kaiser was key to the formulation of early industry legislation, including the HMO Act of 1973, which established regulatory protection for plans that met the requirements of federal qualification. The HMO Act provided a significant impetus for industry growth in its early years.

With the move from regulatory to competitive market approaches in health care, the requirements of federal qualification and other requirements that had been initiated as preferential to HMOs were called into question, even by the industry. The influx of new insurance products, such as the experience-rated PPOs and employer self-insurance plans, which claimed to provide greater cost savings than HMOs and indemnity plans, posed a serious competitive threat to HMOs and other payers. The introduction of the PPS may also have contributed to a slower rate of cost inflation in the fee-for-service sector.

Amid these significant changes it should be expected that the HMO industry, to remain competitive with other health insurance products, would alter its competitive behavior. One of the primary transformations already underway in the industry is evident in the shift across plan types. The older staff and group models relied heavily on utilization control and managed care approaches to reduce the costs of patient care and maintain comparative advantage over the fee-for-service sector, and often owned the hospitals they used. IPAs and networks, especially newer plans, tend to be more loosely structured, and depend less on utilization control and patient care management and more on negotiating discounts with hospitals, physicians and other providers to achieve

comparative advantage based on cost. The risk arrangements used by many of these plans place providers at much greater risk, shielding the HMO from assuming the total risk for patient care.

9.1 HMO Industry Comparative Advantage and the PPS

As noted, HMO model types seek comparative advantage in different ways. Staff and group models, which include the Kaiser plans, rely on utilization control and patient management to achieve comparative advantage over the fee-for-service sector. Staff and group plans often own their own facilities but are contracting out in increasing numbers for services such as hospital care and specialty and routine services to take advantage of hospital price competition.

The HMO industry of 1985 has evolved new structures and plan types since 1980, with a predominance of network and IPA models. Networks and IPAs usually offer a greater choice of providers than staff or group models, and often include a wide range of affiliated physicians and hospitals. Some plans are achieving comparative advantage by selectively contracting with cost-efficient hospitals and physicians, shifting hospital bed use at significant levels in communities like Tampa, where admitting privileges are easily transferred across hospitals.

Another means through which new model types are seeking comparative advantage is by negotiating large blocks of services from hospitals or hospital chains. IPAs and networks are especially suited to take advantage of hospital industry changes in chain affiliation and networking. Plans that are themselves part of a national or regional HMO chain increasingly use their market power in multiple negotiations, joint ventures or partnerships with hospitals. Group and staff models, however, tend not to be as well positioned due to the operational requirements and structure of their model types.

The PPS impacts on individual hospitals and in the aggregate across hospitals in an area are important considerations of access to care at the local level. The PPS may encourage efficiency in the health care delivery system as a whole, or it may generate

further inefficiency at the program level if cost savings are not incurred as a result of enrolling Medicare beneficiaries in HMOs.

9.2 HMO Market Areas and the PPS

A snapshot of the competitive environment of the PPS in 1985 shows that the HMO industry, like other businesses, has diversified its structure to include a wide range of plan incentives with intended and unintended consequences for quality and access to care. Like most businesses, HMOs are also seeking markets that look promising. These areas tend to be already well served by the health care delivery system: metropolitan areas with higher per capita incomes, higher rates of hospital utilization, and a ready supply of local providers.

Many areas of the country are unlikely to be served by HMOs, due to their location in low-income urban neighborhoods or in sparsely populated rural areas that were hard hit by the structural economic forces affecting farming and traditional manufacturing during the early 1980's. Some of these areas had been designated as health care shortage areas in the 1970's. Less affluent suburban areas on the decline also tend to be unattractive markets for HMOs.

Certain plan types, such as staff models, use a limited number of geographically concentrated providers and require heavily concentrated markets to generate enrollment. IPAs and networks appear to be suitably flexible for development on the fringes of or integral to established market areas. IPAs appear to be more adaptable to rural areas than other HMO model types. These market areas, many of which experienced extreme stress throughout the recession of the early 1980s, have always posed problems for the health care system. The federal government has historically acknowledged these difficulties and has supported local health care development through planning grants, Public Health Service grants and personnel, and Area Health Education Centers (AHEC) programs to effect planned change in service availability through medical teaching programs.

HMOs were not designed to serve all populations, across all locations. HMOs are attracted to, and tend to locate in areas where business is growing and general prosperity persists. These types of areas tend to be more affluent, growing, prosperous and well served by health insurance plans and health care services. They are not attracted to, nor are they likely to seek under private initiative, less attractive markets --those that are not thriving--in areas of urban or rural underservice.

Over time, the characteristics of markets favored by HMOs have remained fairly constant, with the result that most plan growth and new plan entry occurs in areas other HMOs have also decided are favorable for contracting and enrollment. Most of these markets are well served by health care providers and tend to have higher health care costs and utilization. Plans are nevertheless expanding to new areas--areas that share the "favorable" characteristics of counties with developed HMO markets.

The PPS is expected to affect local hospital market in different ways, both at the aggregate county market level and as it affects individual facilities (that may serve particular sectors of the population, or provide services in underserved, low income, or rural areas). It will be important to monitor changes in local markets and availability of health care services over time to assess the actual effect of the PPS, to what extent PPS effects may alter competition in different types of health care markets, and how these changes may affect community and industry standards of quality of and access to care.

9.3 HMO Market Behavior and the PPS

The PPS has been associated with several significant behavioral changes in the HMO industry, encouraging greater attention to hospital utilization control and pricing arrangements with providers. Comparative advantage is being achieved in both areas, as HMOs gear up to compete with increasingly attractive, cost effective options in the fee-for-service sector. Plan changes that can be attributed most directly to the PPS include utilization review activities and patient record documentation. These changes have applied not only to Medicare beneficiaries but to employer groups in HMOs and other

insurance plans. Most other changes are more broadly related to the movement of local health care markets.

Other changes have occurred, resulting in a broad diversity of choices for health care consumers in "desirable" markets. AHPs have imposed stricter risk on physicians, hospitals and in some cases suppliers of pharmaceuticals and medical devices. This may occur through per diem negotiations with hospitals, which place hospitals at risk for intensity of care, through withhold arrangements, or by holding primary care physician "gatekeepers" at full risk for a patient's care costs, including hospitalization.

HMOs generally maintain control over utilization review and monitoring, motivated to achieve comparative advantage through control over patient treatment costs. Now, even some plan administrators question how low utilization can go, especially in the hospital, before good medical practice is compromised. Monitoring care for underutilization, as well as for its appropriateness, and for the ability of the local health care delivery system to accommodate changes driven by the market are crucial to effective health care management in the public and private sectors. Special attention should be given to the incentives for access to care in different HMO model types and their potential for improving or restricting use of health services.

Changes in the competitive behavior of plans are of particular importance in assessing the ability of HMOs and CMPs to adequately serve Medicare beneficiaries. Medicare enrollment represents pioneer territory to most HMOs and the risks can be substantial to a plan that is new to senior care and whose "mission" may be oriented to the working well. Medicare membership makes up a relatively small percentage of plan marketing; most plans were developed for, and are designed to serve employer groups. Little guidance has been available to plans, with all but the largest, established plans having built up any experience or having large senior enrollments to spread plan risk adequately for this group.

There is as much diversity in plan organization, administration and responses to competitive pressures. A plan interacts intimately with the market environment of which it is a part. Regional differences, as well as intra-regional variation in market characteristics and ongoing dynamics play important roles in assessments of standards of quality, access to care and competitive response.

PPS gains and losses at the market level or for individual hospitals will be felt differently in different types of health care markets. It is important to monitor these small area variations for patterns of change over time; and whether these variations are related to the expected (or actual) PPS area-level effect. In addition, it is important to monitor areas of potential underutilization or underservice, and to target minimum levels of service at the area level in response to the far-reaching transformations in health care competition and competitive strategy.

9.4 Medicare HMO Contracting and the PPS

Medicare enrollment in HMOs continues to increase, but plans are proceeding cautiously. Too little is understood about how to appropriately serve and price care for the elderly. The overwhelming majority of HMOs orient their benefits and plan structures to the needs of the business community, and the often significant differences in plan focus that are required for Medicare members has limited participation with HCFA at some plans. Areas also differ greatly in the rates payable to plans for Medicare members. The risks and uncertainty are perceived to be inadequate inducements in low AAPCC areas, where plans are likely to be more limited in achieving comparative advantage efficiencies. The lack of interest and capability for Medicare HMO enrollment by these plans warrants judgment of their performance over time.

Medicare enrollment continues to increase nationwide, as increasing numbers of plans seek contracts with the Medicare program and membership continues to grow. However, Medicare HMO enrollment has remained a small portion of plan membership in most HMOs, and has remained at approximately 4.3% of total industry enrollment.

With the exception of a few large plans which gained experience with Medicare populations through early HCFA demonstrations in the late 1970s and early 1980s, most HMOs perceive Medicare contracting with awe, recognizing the potential market in the over-65 population but treading lightly until more is understood about how to serve senior populations. Because the industry has not yet committed itself to serving Medicare members, plan efforts to serve seniors tend to be small and limited and plans are gaining experience slowly.

Plan willingness to consider Medicare services, and plan willingness to contract under TEFRA risk regulations vary according to the level of payment HCFA is prepared to spend. Payment based on the AAPCC encourages plans in higher-cost areas to enroll Medicare beneficiaries, where profits can be achieved relative to the fee-for-service sector. Areas with lower AAPCC rates are viewed as less favorable for risk contracting. The fact that 90% of plans with risk contracts had AAPCC rates in the top third of counties nationwide illustrates the obvious "location bias" inherent in voluntary participation arrangements across local markets.

To date, Medicare HMO markets have demonstrated growth in relatively affluent areas. Those areas where HMOs do not tend to locate will not serve as potential Medicare capitation sites. Areas with lower AAPCC rates view themselves as more vulnerable to the risks of Medicare capitation contracts, and have sought contracts in limited numbers.

Plans differ individually and by model type in their willingness and ability to serve the needs of senior members. Staff models and networks are more likely to serve beneficiaries, although group models maintain the largest numbers of Medicare enrollees.

Networks and IPAs have more Medicare beneficiaries per plan in risk contracts than staff or group models. These plans tend to vary significantly in organization and administrative activity. Many of these plans are newly established, and lack experience

over time with community or senior activity. The newness to the industry of many plan structures poses the question of how each of the HMO model types perform and respond over time in local health care markets. The risk arrangements used by different model types and plans should be examined for full appreciation of plan operations and administration, and patient quality of care and access in an industry in rapid transition.

Not all plans are equally suited to the needs of Medicare beneficiaries. Plans with well-developed employer group programs often experience problems in adapting to Medicare beneficiary health service needs. Small, local plans may lack the resources to provide appropriate senior benefits. Programs for the over-65 group differ greatly across plans, from the profitable Medicare supplement programs to cost and risk contracts. There is no clear consensus among plans about how to serve Medicare beneficiaries most efficiently. HCFA's role in providing enrollment and contracting expertise to HMOs includes responsibility for monitoring and analysis of Medicare utilization and cost in HMOs and in the fee-for-service sector.

At the core of HMO contracting and beneficiary enrollment issues is the relative attractiveness of HMOs and fee-for-service health care. "Attractiveness" is likely to vary according to demographic and utilization characteristics of local health care markets. Systemwide cost savings that may be attributable to HMO location bias should be monitored on an ongoing basis. Small area variations may pose problems of under access to or excess supply of care--which provide the basis for their lower AAPCC rates.

9.5 Impact of the PPS

Medicare's PPS is one of a host of market forces seeking to encourage greater efficiency in the health care delivery system through competitive market policies. Local health care markets represent a broad range of socioeconomic and political conditions. Some systems are well insured and well served; other areas where employment and

growth are suffering may be chronically or temporarily in decline, with less "competitive" health care supports.

The responses of local markets to the forces of competition are of particular importance to areas or populations of underservice in inner-city or rural areas. The vexing question is whether supply can appropriately meet the need for care in these areas. The unique problems of certain types of markets that place them at a disadvantage for competitive market solutions are no longer broadly acknowledged by the federal government, placing the welfare of these areas and their populations at unknown risk.

The PPS is expected to produce different effects across health care markets, and a variety of plan and industry responses can be expected as competition in health markets takes on new forms. The nature and variation of actual PPS impacts under the fully implemented system remains for future study. Monitoring of industry trends and behaviors as they relate to access, quality and costs of care for Medicare as well as for employer groups provides a vehicle for system control.

Location bias is an important concern for advocates of widespread enrollment of Medicare beneficiaries throughout the industry. The fee-for-service standard and local market competition are likely to play important roles in shaping the availability, attractiveness and cost of health care services through AHP or fee-for-service alternatives. How the dynamics of the PPS affect the fee-for-service sector, where medical practice norms are changing rapidly through gains and losses to hospitals, and the spillover effects attributable to the PPS should be examined as a related issue of capitation programs. Location bias will be examined with respect to utilization and cost using state and county reimbursement files in a follow-up report.

Issues of Consideration by HCFA

Several issues related to interest in government capitation arrangements are raised as a result of this research.

1. Capitation design and the appropriateness of plans to employer vs. Medicare populations.

Capitation systems like HMOs have exercised great flexibility in their incentive and payment arrangements. Most plans are employer-focused, and are just now learning about health care for the elderly. Capitation design and risk arrangements warrant careful examination as to their implications for health care delivery to Medicare beneficiaries.

2. Location Bias and the PPS

Certain types of areas attract HMOs. These areas are typically urban and growing, where health care costs are higher and the supply of providers is generous. There are two concerns. First, a recognition that many areas (and enrollees) are unlikely to be appropriate for HMOs. In areas served by HMOs, the significance of changes in the fee-for-service sector, which may or may not be related to the PPS, that may impact on HMO comparative advantage is important as a standard to assess Medicare program expenditures systemwide.

Secondly, the more perplexing problem may be how to address the common problems of health services delivery for population groups or areas considered less "desirable" for private initiative. What sorts of approaches can be developed to improve and develop efficient health care delivery options for beneficiaries in markets with unique and common characteristics that place them at a disadvantage for competitive market strategy?

3. Capitation and systemwide savings for Medicare

The PPS may play an important role in determining the comparative advantage of HMOs not only in the marketplace, but as a choice by Medicare beneficiaries. There is a widely expressed need to better educate beneficiaries about their health care coverage, both in HMOs and in the fee-for-service sector.

The selection and locational bias of HMOs are likely to have significant implications for Medicare program expenditures. This will put the managed-care tenets to the test of its true efficiencies, and may spur new competitive forms to bring efficiency to the fee-for-service sector. Careful program monitoring is essential.

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AGGREGATE DEMAND FOR HEALTH CARE BY THE AGED AND NONAGED: 1965-1985

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Summary

Aged medical expenditures grow more rapidly than those of the nonaged. Indeed, the the decade 1975-1985, they grew one-third faster than nonaged expenditures. If this difference continues, by the year 2000 the aged, who will make up 13 percent of the population, will consume 50 percent of the nation's personal health care. What is the source of this difference for patients who are treated by the same physicians and lie in the same hospitals? It is unlikely that the difference can be explained by changes in the manner in which medical care is produced for the aged and the nonaged. Nor can the difference be explained by their differences in mortality and morbidity. The paper argues that the growth in aged expenditures during the period 1965-1985, and the consequent changes in the distribution of their supply of health services is predominantly a response to differences in the effective aggregate demand for health services by the two groups. Finally, the paper concludes that the example of the importance of aggregate demand in determining expenditures and their distribution has important implications for the regulations of aged and nonaged medical expenditures.

Aggregate Demand for Health Care by the Aged and Nonaged: 1965-1985 *

Introduction: In the two decades between 1965 and 1985, total personal health-care expenditures grew slightly more than ten-fold. The signal event of this time was the passage of Medicare, which greatly helped the aged afford care. Yet, in the second decade expenditures by the aged grew more rapidly than they had in the nine years following the establishment of Medicare. Indeed, they grew one-third faster than the expenditures of the nonaged. If this difference continues, by the year 2000 the aged, who will make up 13 percent of the population, will consume 50 percent of the nation's personal health care.

One perspective on these changes in the use of care by the aged and nonaged can be gained by examining real per-capita expenditures for each group between 1965 and 1984. (Table 1) The growth in expenditures includes the effects on use of all variables other than population. The striking relationship is that nonaged real per-capita expenditures grew by approximately 50 percent while aged expenditures grew slightly more than 100 percent. Also, real nonaged expenditures were essentially

Table 1

Aged and Nonaged Growth in Real Per Capita Expenditures: 1965-1984

Item	1965	1970	1977	1984
Nonaged/Capita	$177.24	213.00	263.21	268.34
Aged/Capita	$527.72	707.97	899.77	1107.25
Total/Capita	$210.54	261.50	333.23	367.33

* The author greatly appreciates the helpful comments of Stephen Kennedy and Monica Noether

unchanged between 1977 and 1984, while aged expenditures continued to grow. Finally, although real per-capita expenditures for the aged and nonaged have grown at decreasing rates, nonaged expenditures have

Table 2
The Annual Rates of Growth in Real Per Capita Expenditures: 1965-1984

Item	1965-1970	1970-1977	1977-1984
Non-Aged/Capita	3.8	3.0	0.3
Aged/Capita	6.0	3.5	3.0
Total/Capita	4.4	3.5	1.4

decelerated much more rapidly than those of the aged. (Table 2)

What is the source of this difference for patients who are treated by the same physicians and lie in the same hospitals? There are, of course, differences in morbidity between the aged and the nonaged as well as differences in care between the two groups. The aged are more frail. As a result they have less surgery and more institutional care. But the differences between the age groups have not changed so over the twenty years that it explains the growth in the proportion of expenditures going to those over 65. Victor Fuchs (Milbank Quarterly) concludes after examining the demographics of the aged, that aged expenditure increases are not related to their levels of mortality and morbidity. He finds that if the elderly are defined as persons 65 years or older who will die within five years, this number as a percentage of total population has grown hardly at all since 1965. Yet, he continues, the expenditures for this group have grown remarkably.

It is unlikely that the changes in the distribution of aged and nonaged expenditures for care can be primarily attributed to changes in the differences in the manner in which health care is produced for these two groups. That is, although a much greater quantity of services is being supplied to the aged, it is unlikely that increases in the numbers of physicians, wage rates changes, improvements in hospital efficiency, or changes in technology or treatment procedures have age specific differences sufficient to explain the differences in the growth of aged and nonaged expenditures.

This paper argues that the growth in aged expenditures and the consequent changes in the distribution of the supply of health services between the aged and nonaged is predominantly a response to differences in the effective aggregate demand for health services between the two groups during the twenty years from 1965 to 1985. Demand is defined here as effective aggregate demand for health care rather than notional demand which refers to a desire or need for goods and services, unsupported by the ability to pay. All this is not to say that the supply of health resources has not increased during these twenty years. It obviously has. The increases in the supply of care to the aged and nonaged are traced by the shifts in aged and nonaged effective demand that result from changes in income, increases in population and changes in the price of medical-care services relative to the price of other goods in the economy.

Historical Background: The social history of medical care in the post-World War II period is distinguished by economic growth and social

legislation that increased the demand for care. The early post-war period until 1967 was characterized by strong economic growth, while the following years were marked by social legislation and considerably poorer economic performance. Martin Feldstein (1980) summarizes the differences in economic performance between the two periods.

> After 1947 the economy began a period of remarkable growth and stability. ...(R)eal GNP rose 45 percent, and in the decade that followed another 48 percent. In only one of those twenty years did real GNP fall by as much as 1 percent.... This sustained and rapid expansion had occurred with a relatively stable price level; the annual rise in the consumer price index averaged only 2 percent. The first two decades of the postwar period were a time of unsurpassed economic prosperity stability and optimism.
>
> The contrast between the strength and achievment of the economy during those years and its poor record since then signals a major change in the performance of the economy over the postwar period. At the aggregate level, real GNP growth slowed... to only 2.9 percent [annually] between 1967 and 1979. ...The average unemployment rate rose from 4.7 percent of the labor force to 5.8 percent. The average rate of consumer price index inflation jumped from 2 percent to 6.7 percent....

In 1966 the introduction of Medicare and Medicaid broadened the availability of medical care to the aged and the categorically eligible nonaged poor by reducing their out-of-pocket price for selected medical services. At the same time other events also increased demand. Private health insurance, a product of the war years, improved markedly. Between 1965 and 1985 the average out-of-pocket price for aggregate personal medical care dropped from approximately 56 percent to 28 percent, making medical care relatively less expensive in spite of inflation. Transfer payments to the aged continued to be increased, eventually reducing the proportion of aged persons in poverty to that of other age groups, despite a decline in their labor force participation

from 17 percent in 1965 to 7.3 percent in 1985. Also, the aged population continued to grow more rapidly than the nonaged, as it had since 1920.

From 1966 aggregate medical-care expenditures began to grow rapidly. Specifically, from 1965 to 1985 expenditures grew 12.4 percent per year--nearly 60 percent faster than in the 1945-1965 period in which they grew 7.8 percent annually. Part of the difference between the two periods reflects greater medical-care price inflation, resulting in part, from the increased demand for care and relatively high rates of general inflation. From 1945 to 1965 medical-care prices increased 3.8 percent annually, whereas from 1965 to 1985 they increased 7.9 percent per year. In part because of greater subsidization, increases in real medical expenditures were larger during the last twenty years; 4.3 percent annually as opposed to 3.9 percent in the earlier period. This is true even though the economy performed much better in the immediate postwar period.

In order to gain the resources required during this time to provide increased real services, suppliers needed to bid them away from competing uses in the economy. If the economy is at full employment for the types of resources that the medical sector uses, as it has been with rare exceptions over the forty years from 1945 to 1985, then the needed resources must be bid away from competing ones through higher prices. The discussion in the health literature of shortages of hospital capital, doctors, nurses, physician assistants or particular configurations of medical care suppliers such as HMO's testfies to the

shortages perceived by policymakers and managers at different times. Analogously, an adjunct literature focuses on the restrictive effects of public and private regulation on the supply of care. The fact that real medical expenditures increased more rapidly during the 1965-1985 period than in the earlier twenty years is indicative of the success the medical sector had in its bidding. From 1965 to 1985 medical expenditures as a percent of GNP grew from 5.9 percent to 10.7 percent. The mechanisms for financing medical care such as insurance and public programs provided the money for the industry to bid up prices and increase the resources devoted to medical care.

The increases in demand, however, between 1965 and 1985 were not shared equally between the aged and the nonaged. There were significant differences. In the years 1970-1985 the economic wellbeing of households headed by men and women under 65 years of age waned. Between 1970 and 1985 real median household income for the nonaged decreased 1.5 percent; during the same period, the same measure for aged households increased 36.7 percent. Between 1980 and 1985 the price of medical care in relation to other goods and services increased for the first time since 1965 because of reduced health insurance. This worsening economic position continued the rapid deceleration and eventual reduction in their demand for care. The welfare of the aged in contrast continued to improve. Their real median household income increased steadily and the relative price of medical care for the aged fell or remained the same. As a result effective demand for care by the aged increased disproportionately.

The Plan of the Paper. The remainder of the discussion examines the manner in which differences in aggregate demand for health care between the aged and nonaged increased the proportion of care supplied to the aged. The annual changes in these aggregate variables trace the changes in the supply of personal medical care services. The paper analyzes the annual rates of growth of five macroeconomic variables: general inflation in the economy, price inflation in the health sector, population growth, changes in real median household income, and changes in the price of medical care in relation to the price of other consumer goods. The first two variables define the degree to which expenditure increases reflect inflation, while the last three define increases in real aggregate demand.

Specifically, the variables which are the sources of change in the distribution of expenditures between the aged and the nonaged are defined in the following discussion and their values displayed in Tables 3 to 10. The bold-face type is the variable label used in the tables.

Medical-care price inflation, is separated into general inflation [INCREASE IN PRICES NET OF MEDICAL CARE PRICES], and medical care price inflation in excess of the increase in general inflation, [INCREASE IN MEDICAL CARE PRICES IN EXCESS OF CONSUMER PRICES]. It is important that these two effects are separated. Historically, medical care prices have increased faster than prices generally. If they had increased at the same rate there would be much less interest in their increase; they would reflect general price conditions rather than industry characteristics. As is discussed in a later section of the paper, the degree to which

medical-care price increases exceed general inflation is an indicator of the price effects of increases in the demand for care.

The Bureau of Labor Statistics medical-care price index that is normally used to measure this inflation was reweighted to adjust for the fact that it reflects only the price of out-of-pocket medical expenditures (Ginsburg), whereas total medical expenditures include both direct payments for care and care financed by third parties. This difference is important insofar as the prices of widely covered services such as hospital care have generally risen faster than the price of services that are more likely to be paid out-of-pocket. Thus, unless the index is reweighted by the different amounts of real services used by the aged and the nonaged to reflect the distribution of total expenditures, the price inflation of the most widely covered services would be relatively understated. Because the aged are heavier users of institutional care the prices of which increase more rapidly, the rate of medical care price inflation for aged expenditures is calculated with the reweighted index to be slightly higher.

Increases in population,[POPULATION GROWTH] led to increases in the aggregate demand for medical care. The aged segment is growing at slightly more than 2 percent annually, while the nonaged segment is growing at slightly less than 1 percent. Clearly, the growth of the aged population adds more to expenditures than the growth of the nonaged population. (Arnett,et al) Therefore, the total population growth is calculated as the weighted average of aged and nonaged population

increases where the weights are the aged and nonaged proportion of medical expenditures in 1965.

A 1 percent increase in real income results in approximately a 1 percent increase in the consumption of medical care.(Paul Feldstein) That is, other factors notwithstanding, over the long run medical care expenditures remain a constant proportion of real income. Some estimates of the income elasticity of medical care are smaller (Newhouse and Phelps). However, such estimates are based on cross-sectional data of observed income. The model used here is based on a measure of permanent income. Permanent income takes into account both wealth and expectations about income over time. Expenditure elasticities based on permanent income can be expected to be higher than on observed income.

Income is measured as the rate of annual increase in adjusted real median household income. Household income covers both individuals and families. Because medical decisions are often family decisions, household income rather than per-capita income is used. The income measure is adjusted to reflect the fact that while business cycles effect annual income, consumption decisions take into account expectations about income and wealth.(Dornbusch and Fisher) Growth in adjusted income is defined here as the annual rate of growth for the previous five years as well as the current period, [INCREASE IN ADJUSTED REAL MEDIAN HOUSEHOLD INCOME]. This adjustment recognizes at least in part the effect of long-term income on medical-care consumption. Unfortunately it does not capture the unknown effect of changes in medical care consumption caused by changes in wealth that result from

changes in the real rate of interest, and the increased certainty of cash flows that results from health insurance.

The consumption of medical care is sensitive to changes in its relative price. (Paul Feldstein) Health insurance and medical care price inflation have had the most significant effects on the consumer's price of care. Insurance has reduced the direct cost of care to the consumer while inflation has pulled in the opposite direction to increase it. Thus, there are two offsetting price effects to examine. The first is the inflation in medical-care prices in relation to the increase in all prices. This inflation, however, has generally been offset by the spread of insurance which decreases the direct prices paid by consumers. The result is that for many years the price of medical care for the consumer decreased in comparison with the price of other goods, leading to an increase in the demand for care. It is estimated that a one percent reduction in price leads to a 0.2 percent increase in medical expenditures. (Paul Feldstein) The measure of the change in demand due to price changes is the net effect of these two forces, [CHANGE IN QUANTITY DEMANDED DUE TO THE CHANGE IN THE RELATIVE PRICE OF CARE].

The sum of these five measures maps the increase in medical care supplied to consumers as the result of increases in aggregate demand. The model after taking into account the demand and price variables and the relevant expenditure elasticities accounts for more than four-fifths of the annual rate of change in personal medical-care expenditures. The unexplained portion is contained in a residual term. There is no single interpretation for this disturbance term. It contains a variety of

errors. There are the effects of unmeasured demand variables such as the time price of care, the amount of demand absorbed by queueing, or production changes such as the amount of services dispensed per visit. In addition, it contains the errors of roughly measured variables. For example, adjusted real median household income may not fully capture the effect of wealth and insurance on the consumption of care.

Changes in the Demand for Medical Care: An Overview of the Years 1965-1985. The annual rates of change in these five aggregate demand variables have been calculated for four distinct periods: 1965-1970, 1970-1975, 1975-1980, and 1980-1985. Initially examining the four periods together provides some insight into the behavior of aggregate demand for medical care. An estimate of the annual rate of increase in demand can be derived from Table 3 as the sum of rows 3, 4 and 5: population growth, increase in adjusted real median household income and the change in the quantity demanded due to changes in the relative price of medicial care. These annual rates of growth, shown as the first row of Table 4, indicate that aggregate real demand has grown at a decelerating rate. Declining from a 4.9 percent annual increase in 1965-1970 to 0.7 percent annual increase in 1980-1985.

In addition, Table 4 supports the view that medical-care price inflation is a function of both general levels of inflation and increased demand for care. From 1965 to 1980, smaller increases in demand are associated with smaller differences between medical-care price inflation and general inflation. The difference in the 1970-1975 period appears to have been smaller than expected because of both the

Table 3

The Distribution of Increases in Personal Health-Care Expenditures 1965-1985

Factor:	1965-1970	1970-1975	1975-1980	1980-1985
Annual Percent Change in Health Care Expend.	12.7	12.4	13.4	11.1
Accounted For By:				
1. Increase in Prices Net of Medical Care	4.1	6.7	8.8	5.3
2. Increases in Medical Care Prices in Excess of Consumer Prices	2.1	0.3	0.9	3.6
3. Population Growth	1.3	1.3	1.4	1.2
4. Increases in Adjusted Real Median Hsehold Income	2.6	0.8	-0.5	-0-
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	1.0	0.4	0.5	-0.7
Amount Accounted For:	11.1	9.5	11.1	9.4
Residual	-1.6	-2.9	-2.3	-1.7

Economic Stabilization Program, and voluntered provider restraint. Nevertheless, the increase in price was appropriately smaller than in the earlier period. 1/

The exception to the general relationship appears to be the 1980-1985 period. Medical care price inflation is large relative to the increase in demand. This may be due to a shift in supply different from earlier shifts or to a change in the elasticity of supply that reflects

cumulative efects of increased regulation of reimbursement and capital within the industry or the costs of changing patient demand and the shift toward HMOs and less hospitalization.

Table 4

Medical Care Price Inflation, General Price Inflation, and the Demand For Medical Care: 1965-1985

	1965-1970	1970-1975 /1	1975-1980	1980-1985
Annual Rate of Increase in the Demand for Medical Care	4.9	2.5	1.4	0.6
Increase in Medical Care Prices	6.1	6.9	9.5	8.7
Increase in Consumer Prices	4.2	6.7	8.9	5.5
Difference Between Medical Care Price Inflation and Consumer Price Inflation	1.9	0.2	0.6	3.2

1/ Economic Stabilization Program: August 1971 - April 1974

Within each of the five year periods there is considerable homogeneity in price and income behavior. The 1965-1970 period was a period of rapidly increasing annual real median income. It was also characterized by sharp decreases in the relative price of medical care. both of these events increased demand. Medical-care price inflation reflected this increased demand for care. The 1970-1975 and 1975-1980 periods are quite different from the initial one. Annual real median income decelerated in the first half of the decade and had declined by the end of it. The decline in the relative price of care as the result of insurance improvments were more moderate. Medical-care price

inflation was slight, reflecting price controls and the small increase in demand. General inflation was the most important cause of increased expenditures; during the decade it accounted for 60 percent of the annual change. The ending period, 1980-1985, is again different from the preceeding ones. Per capita demand for medical care declined as a result of no growth in real income and a decline in insurance coverage. General inflation declined, but medical-care price inflation became more important than in the previous 15 years despite the apparent decline in per capita demand.

In addition, during these years, health policy reflected the economic times. Daniel Fox (Milbank Quarterly) notes that "by the late 1960's a consensus about how to organize and pay for medical care was supported by a larger and more powerful coalition than any time in the past. He continues,"they assumed that in the near future, regional hierarchies of institutions and practitioners...would become more rational and efficient." There seemed to be "a spendid balance among competing groups." Beginning in the 1970's, however, the effect of public subsidies for biomedical research, professional education, and improved access to services unintentionally eroded these relationships. "The hope," Fox writes,"that economic growth would absorb the increasing cost of medical services has proven profoundly wrong." Paul Starr labels the 1970's as a period in which occurred an "End of a Mandate," and the beginning of "an underlying tension... between a medical care system geared toward expansion and a society and state requiring some means of control over medical expenditures." By the 1980's the regulatory

strategies of the 1970's had given way to the Reagan strategy of competition, incorporation and privatization. Each period,then, displays aggregate economic and policy factor homogeneity, while there is heterogeneity among them

Changes in Aged and Nonaged Demand for Medical Care: 1965-1970. The patterns outlined in the previous summary do not separate the contrasting growth in demand for the aged and nonaged populations. The following examines these difference. The 1965-1970 period

Table 5

The Distribution of Aged and Non-aged Increases in Personal Health Care Expenditures: 1965-1970

Factor:	All Ages	Non-aged	Aged
Annual Percent Change in Health Care Expend.	12.7	11.3	14.3
Accounted For By:			
1. Increase in Prices Net of Medical Care	4.1	4.1	4.1
2. Increase in Medical Care Prices in Excess of Consumer Prices	2.1	2.0	2.5
3. Population Growth	1.3	0.9	2.1
4. Increases in Adjusted Real Median Hsehold Income	2.6	2.6	2.9
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	1.0	1.0	1.0
Amount Accounted For	11.1	10.6	12.6
Residual	-1.6	-0.7	-1.7

(Table 5) was the first to experience, the chronic rapid growth of expenditures that has characterized the last twenty years. Medicare and Medicaid lowered the out-of-pocket price of medical care and redistributed care toward the aged and the poor. Health insurance coverage for the rest of the population also expanded significantly. The reduction in out-of-pocket costs was sufficiently steep for both groups to cause medical services to become relatively less expensive despite medical-care inflation.

In addition population growth and increases in real median household income pushed up the demand for care. Unadjusted real median income rose nearly 3.0 percent annually and afforded the extension of health insurance. Partitioning expenditures between the aged and the nonaged indicates differences in population growth, price inflation, and income growth (primarily transfer payments) resulted in aged expenditures growing roughly 25 percent faster than nonaged expenditures. Nevertheless aged and nonaged demand grew more equally than in any subsequent period. Aged demand grew at an annual rate of 6.0 percent while nonaged demand grew 4.5 percent.

Aged and Nonaged Demand 1970-1980. Even though total expenditures continued to expand at about the same rate, the decade 1970-1980 contrasts in several ways with the initial period. (Tables 6 and 7) Stagflation, with rising unemployment and rising prices, dominated both halves of the decade. The period included the Economic Stabilization Program from August 1971 to April 1974, the 1973-74/75 recession, and the oil crises of 1973/4 and 1979.

General inflation was the largest single item boosting expenditures during the period. The inflation in the first five years would have been larger if price increases had not been stifled by the Economic Stabilization Program that was in force between August 1971 and April 1974. Medical-care price inflation in excess of general price increases was slight, reflecting the small increases in demand, and the combined

Table 6

The Distribution of Increases in Aged and Non-Aged Personal Health Care Expenditures By Age 1970-1975

	All Ages	Non-Aged	Aged
Factor:			
Annual Percent Change in Health Care Expend.	12.4	11.8	13.9
Accounted For By:			
1. Increase in Prices Net of Medical Care Prices	6.7	6.7	6.7
2. Increase in Medical Care Prices in Excess of Consumer Prices	0.3	0.2	0.7
3. Population	1.3	0.9	2.4
4. Increase in Adjusted Real Median Hsehold Income	0.8	0.5	2.9
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	0.4	0.4	0.3
Amount Accounted For:	9.5	8.7	13.0
Residual	-2.9	-3.1	-0.9

effects of the Economic Stabilization Program and voluntered physician and hospital price restraint.

Despite the general inflation, the relative price of medical care continued to fall for the aged and nonaged alike. Health insurance continued to expand but at a slower rate. Medical care continued to become relatively cheaper, although the out-of-pocket price of care was falling less rapidly. The parallel movement in the decline in direct payments for care by the aged and the nonaged continued, as illustrated by the similarity of increases in demand due to price changes for both groups.

Unadjusted annual real median household income which had increased rapidly between 1965 and 1970, declined 4.4 percent during the decade. For the nonaged, the contribution during the decade of increases in long-term real income growth to medical-care expenditure was nil. Medical care expenditures for the nonaged, however adjusted slowly to the slowed growth in household income and continued to increase. As nonaged expenditures adjusted to the slower income growth the unexplained nonaged residual term in tables 6, 7 and 8 became smaller. On the other hand the income of the aged continued to increase apace not requiring any downward adjustment. Medical-care consumption by the aged is protected from economic adversity, not only through insurance but also through rising transfer payments. As a result the growth in demand by the aged during the decade was strikingly different from that of the nonaged. From 1970 to 1975 the aged demand grew 5.6 percent annually,

while the nonaged increased only 1.9 percent annually. Similarly from 1975 to 1980 aged demand grew 4.7 percent annually and nonaged 0.7 percent.

Table 7

The Distribution of Increases in Aged and Nonaged Personal Health Care Expenditures: 1975-1980

	All Ages	Nonaged	Aged
Factor:			
Annual Percent Change in Health Care Expend.	13.4	12.6	15.3
Accounted For By:			
1. Increase in Prices Net of Medical Care Prices	8.8	8.8	8.8
2. Increase in Medical Care Prices in Excess of Con sumer Prices	0.9	0.7	1.2
3. Population Growth	1.4	0.9	2.5
4. Increase in Adjusted Real Median Hsehold Income	-0.5	-0.3	1.7
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	0.5	0.5	0.5
Amount Accounted For:	11.1	10.6	14.7
Residual	-2.3	-2.0	-0.6

Aged and Nonaged Demand: 1980-1985. The half decade 1980-1985 was a watershed period in which the rate of increase in medical care expenditures began to slow. To permit a more detailed examination of

this period it has been partitioned between 1980-1983, a time of recession and 1983-1985, a time of economic recovery. During

Table 3

The Distribution of Increases in Aged and Nonaged Personal Health Care Expenditures: 1980-1985

Factor:	All Ages	Non-Aged	Aged
Annual Percent Change in Health Care Expend.	11.1	9.5	14.2
Accounted For By:			
1. Increase in Prices Net of Medical Care Prices	5.3	5.3	5.3
2. Increase in Medical Care Prices in Excess of Consumer Prices	3.6	3.4	3.9
3. Population Growth	1.2	0.8	2.2
4. Increases in Adjusted Real Median Hsehold Income	-0-	-0-	1.7
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	-0.7	-0.8	-0.4
Amount Accounted For:	9.4	8.4	12.7
Residual	-1.7	-0.8	-1.5

the entire 1980-1985 period, the nonaged contributed most to the slowed growth in expenditures. Their real income was essentially the same in 1985 as in 1980, and the relative price of medical care had increased over 1980, because of a loss of health insurance resulting from high levels of unemployment and cutbacks in fringe benefits. As a result, the

increase in medical-care prices was not offset by a continuing spread of health insurance. The resulting price increase for medical care reduced overall demand for care by about 0.7 percent annually. The decrease,

Table 9

The Distribution of Increases in Aged and Non-Aged Personal Health Care Expenditures:1980-1983

Factor:	All Ages	Non-Aged	Aged
Annual Percent Change in Health Care Expend.	12.7	11.2	15.9
Accounted For By:			
1. Increase in Prices Net of Medical Care Prices	6.3	6.3	6.3
2. Increase in Medical Care Prices in Excess of Consumer Prices	4.2	4.1	4.6
3. Population Growth	1.2	0.8	2.2
4. Increases in Adjusted Real Median Hsehold Income	-0.5	-0.7	1.9
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	-0.8	-0.8	-0.5
Amount Accounted For:	10.4	9.7	14.5
Residual	-2.3	-1.5	-1.4

however, was twice as great for the nonaged as for the aged. Also, aged income continued to rise. Aged expenditures during the 1980-1985 period grew nearly 50 percent faster than those of the nonaged, and 80 percent of that estimated difference was due to demand differences.

Table 10

The Distribution of Increases in Aged and Nonaged Personal Health Care Expenditures: 1983-1985

	All Ages	Non-Aged	Aged
Factor:			
Annual Percent Change in Health Care Expend	8.6	7.0	11.7
Accounted For By:			
1. Increase in Prices Net of Medical Care Prices	3.8	3.8	3.8
2. Increase in Medical Care Prices in Excess of Consumer Prices	2.5	2.4	2.9
3. Population Growth	1.2	0.8	2.2
4. Increases in Adjusted Real Median Hsehold Income	0.6	-0-	1.4
5. Change in Quantity Demanded Due to Changes in the Relative Price of Medical Care	-0.5	-0.8	-0.5
Amount Accounted For:	7.6	6.2	9.8
Residual	-1.0	-0.8	-1.9

. Specifically, higher rates of population growth, more rapid growth in household income, and a smaller rise in the relative price of medical care. Essentially, throughout this period aged demand continued to grow and nonaged demand is estimated to have declined.

During the years 1983-1985 aged and nonaged expenditures increased at the lowest rate in the twenty years under observation. The primary cause of this slowed expenditure growth was the reduction in general

inflation. Although both general inflation and incremental medical price inflation decreased in 1983-1985, medical-care price inflation was higher than would be expected, given the demand for care.

The differences in the growth of aged and nonaged per capita demand for the twenty years is summarized in Table 11. As expected, given the differences in demand increases described for the two groups, the aged increases have been larger than those of the nonaged. These differences have been especially large for the fifteen years starting in 1970. Also, the deceleration in demand by the aged has been much slower.

Table 11

The Estimated Deceleration in the Rate of Increase in Demand for Medical Care

	1965-1970	1970-1975	1975-1980	1980-1985
Annual Rate of Increase in Demand for Medical Care 1/				
All Groups:	3.6	1.2	-0-	- 0.7
Aged:	3.9	3.2	2.2	1.3
Non-Aged:	3.6	0.9	0.2	-0.3

1/ The sum of the annual rates of change in real median income and, changes in quantity demanded due to changes in the relative price of medical care.

Conclusions. The evidence presented here indicates that general inflation and increases in aggregate demand for care map the increases in personal medical-care expenditures. Also, the differential rates of

increase in demand by the aged and the nonaged have strongly contributed to their differential rates of expenditure growth.

The increase in the growth of demand for the aged and the nonaged has decelerated during the past twenty years. In aggregate, the rate of growth has fallen from 4.9 percent annually from 1965 to 1970 to 0.7 percent annually in the years 1980 to 1985. The rate of deceleration for the aged has been roughly 3.3 percent per year, with demand growth decreasing from 6.0 percent to 3.5 percent. The non-aged rate of decleration has been much more rapid. In the years 1980 to 1985 aggregate demand by this group is estimated to have decreased at the rate of 0.3 percent annually, whereas in the 1965-1970 period it increased at the rate of 4.5 percent.

The lack of increase in real household income for the nonaged since 1970 means that income has not increased demand for this group. On the other hand, the continued increases in money transfer payments to the aged has contributed to an increase in their demand for care. The increased transfer payments has, among other things, afforded the aged the opportunity to purchase additional health insurance. Real median aged household income grew, primarily as the result of enhanced transfer payments, from one-third of nonaged income to one-half between 1967 and 1985. The more rapid population growth of the aged has also contributed to their increase in aggregate demand. The change in the relative price of care has been similar for the two age groups. Between 1965 and 1980 medical care became relatively less expensive for the two groups because of the spread of health insurance. After 1980 health insurance coverage

changed relatively little in aggregate. As a result, the relative price of care increased for both groups, with the increase for the nonaged being the larger.

In the 1980-1985 period aggregate demand growth slackened for both groups as a result of relative increases in the price of medical care. The nonaged contributed most to the slackening of the rate of growth in aggregate personal medical-care expenditures during this period. The overwhelming source of continued rapid expenditure increases was price inflation. Similarly, the major contributor to the slowed rate of total expenditure growth was the deceleration in the increase of consumer prices. General inflation over the twenty-year period contributed about 50 percent of the annual increase in expenditures. The additional increment of medical care inflation contributed about 13 percent annually. Medical-care inflation appears to be the result of the effects of both general price inflation and increases in the demand for care. In the 1980-1985 period changes in supply behavior apparently contributed to a widening of the difference between general inflation and medical-care price increases.

In general, the role of aggregate demand in determining the rate of growth and distribution of medical-care expenditures has several important consequences. First, even though the rate of expenditure growth is currently in a range that has not been seen since the 1965-1970 period, an improvement in economic performance that benefits the nonaged can be expected to increase the demand for care and consequently

increase the rate of growth in expenditures. This is a fairly benign effect insofar as real growth also increases the economy's ability to pay for the increase. However, the powerful financial forces underwriting increases in demand will allow the health sector to further expand by bidding resources away from competing sectors. It is becoming increasingly clear that policymakers feel that the growth of medical care expenditures must be kept more nearly in line with the growth of the economy.

In addition, insofar as there are increases in demand that strongly contribute to the growth in expenditures, the task of microeconomic regulation will be harder. It is difficult for regulations to distinguish between changes in price and quantity that reflect demand effects and price and quantity changes that result from economic inefficiencies, economic power, and cost push effects.

Further, while the economy performed considerably better in the 1945-1965 period, real increases in medical care were larger in the last twenty years (4.3 percent annually and 3.9 percent respectively). This shift was achieved through subsidization of the medical-care industry by public and private insurance and cash transfers. The solution of reining in increases in effective aggregate demand especially for groups whose wellbeing has been the focus of considerable effort, is not palatable.

Finally, efforts to control the demand of health-care institutions and that of physicians for patients in the face of strong increases in patient demand invites conflict between the institution providing care and the patient demanding it. Also, as this paper has demonstrated, a

large proportion of the expenditure increases is caused by factors exogenous to the health industry. For example, increases in transfer payments and general inflation are not controllable by health policy makers. It is these difficulties rooted in the importance of aggregate demand in determining personal medical care expenditures that make regulatory health policy so difficult.

Footnote

1/ The relationship posited between the increment of medical care inflation beyond the increase in consumer prices net of medical care and the increase in demand for medical care as measured by increases in population, changes in adjusted real median household income and changes in the relative price of medical care has existed throughout the post war period until 1980.

The author extended the same statistical series for five year intervals back to 1950. The entire series can be well described by the equation:

$$Y = .19\, e^{0.46*d}$$

where Y = the difference during the period in the annual rate of change between the increase in the CPI net of medical care and the increase in the medical care price index

d = the annual rate of change in the demand for medical care.

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